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SPONTANEOUS SUBARACHNOID HEMORRHAGE: REPORT OF FOUR CASES.*

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Spontaneous subarachnoid hemorrhage is the name generally applied to the clinical condition characterized by the sudden onset, without trauma, of certain intracranial or meningeal symptoms accompanied by homogeneously bloody spinal fluid. The consensus of opinion is that this condition occurs not infrequently but is seldom diagnosed. Within the past four years we have recognized four cases on the medical service at the University of Virginia Hospital and our experience with these has convinced us that not only is spontaneous subarachnoid hemorrhage fairly common, but that its recognition and treatment are important.

Wilkes, Gintrac and Hayem[1] described subarachnoid hemorrhage pathologically and clinically in the latter part of the nineteenth century but little attention was paid to their work until, with the advent of lumbar puncture, Froin's[1] thesis in 1904 renewed interest. In the following years many observations on the subject were published in Europe but apparently were neglected by British and American physicians. The first American reference to it occurred in 1914 when Leopold[2] published three case reports. In England, Symonds[3] reviewed the literature comprehensively in 1924. At that time he was able to collect 124 cases and he added three new ones of his own. Since 1926 many articles have appeared both in England and in this country. Josephine Neal[4] revived and stimulated American interest in the matter and for the past five years the condition has been recognized more frequently. Smith's[5] presentation of twelve cases before the Southern Medical Association and Ayer's[6] very recent report of thirty-two cases before the American College of Physicians have done much to clarify its clinical aspects. Symonds' classic article contains a full bibliography to 1924 and the contributions of Smith and Ayer bring the bibliography up to date. Bagley[7] and Forbus[8] have made important recent contributions to the pathologic changes.

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Etiology

There are many underlying causes for spontaneous subarachnoid hemorrhage and so it has been repeatedly emphasized that since the hemorrhage is but a symptom, each case deserves thorough etiological study. Aneurysm of a cerebral vessel (of arteriosclerotic, embolic, syphilitic or congenital origin) has been accepted as the most common primary cause. It has been generally stressed that syphilis is a relatively rare cause of these aneurysms. Ayer[6] seems especially impressed with the frequency of congenital aneurysms in or near the Circle of Willis. Forbus[8] has recently shown that miliary aneurysms of the superficial cerebral arteries may occur quite independently of arteriosclerotic or inflammatory cause. He believes that these aneurysms are not congenital malformations as such but are acquired from a combination of focal weakness in the vessel wall at the point of bifurcation resulting from a congenital defect in the muscularis coat, and degeneration of the internal elastic membrane due to continued overstretching from blood pressure. The acute onset of symptoms often follows a hypertension either sustained or paroxysmal (in such conditions as eclampsia, pertussis, epilepsy, childbirth, etc.). Other causative factors that have been mentioned are typhoid fever, the exanthemata, sinus thrombosis, epidemic encephalitis, paralysis agitans, and exposure to sun, lead or alcohol. Certain hemorrhagic diatheses (i. e., pernicious anemia, the leukemias, hemophilia and scurvy) have been held responsible for some cases. Venous anomalies according to Bagley[9] produce the condition in children. Tumors and cysts of the brain are considered uncommon causes. Goldflam[1] has suggested the possibility of bleeding from vasomotor disturbance but this is questioned by many.

Pathology

The pathologic changes vary according to the site and cause of the bleeding. Hemorrhage into the basal subarachnoid space occurs more frequently than over the vault of the brain but the blood may spread over the cortex as well as into the subarachnoid area surrounding the medulla and spinal cord. When the bleeding occurs over the surface of the cerebral hemispheres, Symonds[3] states that the spread is generally slower, but if not restricted, the blood finally arrives at the basal space along the line of the main cortical vessels by way of the sulci. Leucocytic infiltration of the meninges frequently develops as a result of meningeal irritation and sometimes adhesions follow. Bagley[7] has done excellent experimental work in dogs along these lines. The precise spot from which the bleeding occurs has not been located in many instances since the exact site of leakage is often difficult to find when the rupture in the vessel is small and surrounded by clot formation.

Symptoms

The symptoms may be divided into two main groups: (a) those due to mechanical pressure and (b) those due to irritative effects of blood in the subarachnoid space. The initial clinical picture varies according to the localization, the site, the rapidity, and the amount of the hemorrhage. If the spread of the hemorrhage is prevented, signs of localization may appear. When diffusion of the blood occurs, the signs and symptoms of increased intracranial pressure, sometimes even including those of medullary compression, are found and choking of the optic discs and retinal hemorrhages may be seen. Basal hemorrhages generally spread more quickly. The rapidity and amount of extravasation determines the acuteness and severity of the initial symptoms.

The degree of meningeal irritation depends on the amount of blood in the subarachnoid space and the length of time that it has been there. Stiffness of the neck, diffuse pains, general hyperesthesia, Kernig's and Brudzinski's signs may be found, provided the symptoms of meningeal irritation are not masked by those of mechanical pressure. Fever and leucocytosis occur in nearly all the severe cases, presumably as a result of absorption of blood by the serous membranes of the meninges. If the patient lives through the first shock, the clinical picture varies, due to the balancing of the factors of intracranial pressure and meningeal irritation.

Symonds[3] has differentiated four clinical groupings:

1. A sudden large hemorrhage causing such immediate and gross increase of pressure that coma and death ensue within a few hours. (Case 3.)
2. A sudden and gross hemorrhage which is checked. The patient then passes from a state of coma to one of mental confusion with subsequent headaches. (Cases 1, 2 and 4.) This may lead to recovery or death may occur from subsequent hemorrhage.
3. A sudden slow hemorrhage of a mild character which causes an abrupt onset of headache and vomiting; if progressive, this may lead to mental confusion, coma and death; if checked, it may be followed by recovery at any stage of the illness.
4. A slow leakage, as from a vein, may give rise to the gradual onset of headache and vomiting; if progressive, it may lead to mental confusion, coma and death; if checked, it may result in recovery at any stage of the illness.

Laboratory: The spinal fluid is generally under increased pressure. When removed in several tubes it is equally bloody in each and on standing no coagulum is formed. The supernatant portion of the fluid after centrifugalization is often yellow. If the supernatant fluid is xanthochromic, it indicates that the blood has been in contact with the fluid sufficiently long for hemolysis to occur. The homogeneity of the fluid differentiates it from the bloody fluid sometimes obtained as a result of trauma to a vessel during the course of the puncture. In this latter instance each successive tube withdrawn is less bloody and there is a tendency to the formation of a coagulum. The supernatant fluid should always be clear.

A large amount of albumin may be present in the urine for several days after the hemorrhage but it usually clears up completely in a short while. The name "massive albuminuria" has been given to this phenomenon and it is considered by some a good diagnostic sign when present. There has been much discussion of its causation. Symonds[3] concludes that there is good physiological evidence supporting the view that it may be due to a disturb-

ance of the nerve centers concerned with renal secretion. However, definite proof is lacking that the kidneys themselves may not be temporarily or permanently damaged. Glycosuria has been reported in some cases and may also be due to a medullary disturbance.

Diagnosis

The finding of the characteristic spinal fluid in cases where the onset is sudden and not traumatic and in which no permanent paralyses ensue justifies a presumptive diagnosis of spontaneous subarachnoid hemorrhage. It is important to differentiate extradural hemorrhage and subdural hematoma since these conditions are often best treated surgically. Extradural hemorrhage is nearly always traumatic and unless the dura is broken the blood does not enter the subarachnoid space. Subdural hematoma is generally a more chronic condition. Localizing signs are more likely to occur in these than in spontaneous subarachnoid hemorrhage.

Intracerebral hemorrhage may rupture from the cortex into the subarachnoid space or it may break into the ventricle and thence emerge into the spinal fluid; but when such hemorrhage is sufficiently extensive to be confusing, death or permanent paralyses ensue. The youth of the patient and the lack of arteriosclerosis or hypertension are often helpful in excluding the probability of an intracerebral lesion. Some rapidly fatal cases of spontaneous subarachnoid hemorrhage can be conclusively differentiated only by a careful necropsy examination.

Prognosis

The prognosis is always grave but depends to some extent on the etiology. It seems more favorable in the congenital anomalies. If the patient survives the initial shock of the hemorrhage, recovery even from focal symptoms may be complete but sequelae from meningeal adhesions sometimes occur. The possibility of recurrence is always to be considered.

Treatment

The control of intracranial pressure and the removal of the irritating blood are the logical aims of treatment. Fortunately, both of these can often be attained by spinal puncture which must be done very cautiously because further hemorrhage has been attributed to relieving the pressure too suddenly. Symonds[3] recommends that during the early stage, while the hemorrhage is progressive, therapeutic lumbar puncture should be used only to control a dangerous rise of intracranial pressure. During the later stage when meningeal symptoms predominate, repeated lumbar punctures may be carefully done but it seems advisable not to reduce the spinal fluid pressure below 100 mms. of water. Kennedy and Wortis[10] have recently advocated elevation of the head fifteen to forty-five degrees, administration of large doses of caffeine and hypertonic glucose enemas as medical measures to control intracranial pressure. Magnesium sulphate enemas and intravenous hypertonic glucose solution are also sometimes helpful. Recent work indicates that intrathecal injections of air following drainage may be beneficial. Intraspinal injection of coagulants has been tried but it is of doubtful benefit and not without danger. Subtemporal decompression occasionally becomes imperative. In surviving cases prolonged convalescence with continuous avoidance of physical strain is advisable.

Report of Cases

Case 1. A twenty-seven year old law student was rolled into the office in a wheel chair at 9:00 A. M., October 6, 1927. He was entirely irrational, disoriented and vomiting profusely. He had no fever and since he was known to have indulged in alcoholic sprees, it was thought that he was drunk, so he was sent home in a car to be put to bed. He was seen again at 6:30 P. M. because he was still in a coma. At this time the history was pieced together that he had arisen sober at the usual hour and had walked to class with a friend. Suddenly he had asked that a car be called to take him to the hospital "because he felt so dizzy that he could not stand up without holding on to something." On arriving at the hospital he had stepped into the wheel chair and the friend went back to his class. A few minutes later he was in the state described above.

When seen at 6:30 P. M. he was in a complete coma and had a temperature of 101.8° (rectal). There was a slight nystagmus, general flaccidity without paralysis, stiff neck, bilateral Babinski's sign and a suggestive Kernig's sign. The fundi could not be examined because the pupils were too contracted. The leucocyte count was 32,000 and there was a trace of albumin in the urine which was otherwise normal. The spinal fluid was under more

than 350 mm. pressure and was homogeneously bloody. Twenty c.c. were removed. This fluid, after centrifugalization, was perfectly clear. Both blood and spinal fluid Wassermanns were negative.

The patient became incontinent of both urine and feces during the night. The next morning he could be aroused and the signs of meningeal irritation had disappeared. That afternoon another puncture showed the spinal fluid under 180 mm. pressure. Red and white cell counts on this fluid indicated that by comparison with the cell counts of the blood, there was an approximate increase of 1,500 white cells per cmm. of spinal fluid. The patient was slightly better and although babbling almost incoherently, he could complain of headache and he was able to recall his college address correctly.

On the fourth day of the illness 10 c.c. of a less bloody fluid were removed and on the sixth day, 15 c.c. were taken off. On the twelfth day an additional 15 c.c. were drained; this was almost clear but rather straw-colored. During the next two weeks improvement was slow but he could recognize his friends and at times appeared entirely rational. He was allowed to get up at the sixth week and seemed completely himself. He was discharged on the first of December, eight weeks after onset, apparently as well as ever. He was thoroughly examined one year later and no evidence of any permanent effects of his illness was found. His urinalysis was normal at this time. He has now been practicing law for three years without any further difficulty.

The patient had had several operations in his infancy for plastic repairs of congenital defects and careful search of his peripheral arteries revealed an aneurysmal dilatation of his right radial artery. This led us to the assumption that the subarachnoid bleeding had come from a congenital cerebral vascular anomaly.

Case 2. A fifty-six year old white housewife was admitted to the hospital at 4:00 P. M., September 20, 1929. On the preceding day she seemed to have felt as well as usual and at bedtime she had had no complaints. At 5:00 A. M., eleven hours before admission, the patient arose to go to the bathroom and fell. Her daughter found her unconscious and summoned a physician, who found no paralyses but discovered that her neck was stiff. Although the patient had no fever at this time her leucocyte count was 20,000. A consultant was called who agreed that the patient probably had meningitis. During the day she vomited frequently but her mental state improved and she complained of a very severe occipital headache.

Admission physical examination showed a sleepy, semi-comatose woman who was fairly well oriented when aroused and complained only of a violent occipital headache. She talked little but could understand. There were no muscular paralyses. The neck was very stiff. The pupillary reflexes were sluggish and the right eye focused poorly. No edema of the optic discs was present. The heart, lungs, and abdomen were negative. The blood pressure was 150 systolic and 90 diastolic. Reflexes of the extremities were normal.

A lumbar puncture was immediately performed and a normal initial pressure was found. Fifteen c.c. of homogeneously red fluid were removed. Following this the headache was less and the patient became more rational. Two days later she became restless and again complained of intense pain in the neck with some nausea. The blood pressure had risen to 180 systolic and 110 diastolic but otherwise the examination was unchanged. Twenty c.c. of spinal fluid were removed. The pressure and character of the fluid were as before. The patient's improvement was gradual until discharge on October 12th, three weeks after onset, at which time she was fairly comfortable. Her maximum temperature in the hospital had been 101.2° (rectal); the highest leucocyte count 16,000. A very slight trace of albumin was present in the first urinalysis but subsequently it disappeared entirely. Both blood and spinal fluid Wassermanns were negative.

This patient has been followed at frequent intervals for the past two years and she has survived a severe attack of pneumonia during this time. She was known to have had a normal blood pressure before her hemorrhage but since that time she has had an average systolic pressure of 200 mm. Hg. with a diastolic pressure usually about 120 mm. Hg. The cause of the hemorrhage in this case is obscure. The patients' age would favor arteriosclerosis and hypertension as factors but there was no demonstable evidence of either at the onset of the

illness. A congenital vascular anomaly seems not improbable.

Case 3. A twenty-two year old medical student was brought to the hospital at 5:30 P. M., April 15, 1930. One month previously he had received treatment for a broken nose and facial contusions but he had apparently made a complete recovery. On the afternoon of his admission he had gone to the gymnasium for his usual exercise and while skipping rope he had collapsed and had been brought immediately to the Hospital in an unconscious state.

When first seen the most striking feature was his acute respiratory failure, manifested by a respiratory rate of three per minute and extreme cyanosis especially of the arms, face and chest. Artificial respiration and large intravenous doses of caffeine and adrenalin were given at once. Within five minutes the breathing had increased to fifteen and the cyanosis had almost disappeared but large bubbling rales were still present over both lungs and there was no sign of consciousness. Full examination about an hour after onset revealed sluggish pupillary and corneal reflexes. It was thought that there was slight but definite bilateral edema of the optic discs. Small areas of retinal hemorrhage were seen on the left. Deep reflexes on the right were slightly hyperactive. The blood pressure was 135 systolic, 90 diastolic. A diagnosis of intracranial hemorrhage was made and 60 c.c. of 50 per cent glucose solution was given intravenously without improvement. The advisability of lumbar puncture was considered but it was thought unsafe. A left subtemporal decompression by Dr. E. P. Lehman revealed a tremendously increased intracranial tension and a thin layer of subarachnoid blood over the exposed surface of the brain. Closure was made with difficulty. The patient developed pulmonary edema and died of respiratory failure at 11:30 P. M., six hours after onset. During the agonal phase the temperature rose to 102.6° (rectal), the blood pressure to 180 systolic, respiration to 30, and the pulse to 164.

Necropsy the following morning was confined to the cranial contents. A film of blood was present over the entire surface of the brain and the subarachnoid fluid was very bloody. A careful search for organization of blood-clot or other evidence of old cerebral injury was made on account of the history of possible intracranial damage one month previously but nothing was found to indicate this. The brain has been studied grossly and microscopically by Dr. Charles Bagley, Jr., of Baltimore, whose previous work[7-9] on the pathologic changes in similar cases has done much to increase our knowledge of the subject. He has been good enough to furnish the following brief description with a photomicrograph:

"The specimen was examined after fixation in formalin and the entire surface was blood stained. The blood was diffused through the pia-arachnoid mesh, in greater quantity at the base. Blocks from various parts of the cortex showed nothing abnormal further than the presence of the blood. The entire base was studied in sections from a point anterior to the chiasm to the interpeduncular space.

Figure I.

Photomicrograph from brain-section in Case 3, showing posterior communicating artery (a) with well defined elastic tissue layer. To this is attached the abnormal branch with a very small amount of elastic tissue extending from (b) to (c). The outer portion of this vessel is ragged and torn, (d) marking the actual point of the rupture.

(Courtesy of Dr. Charles Bagley, Jr.)

"In one of the blocks taken from this area a branch of the left communicating artery was found to be dilated and ruptured. The wall of this branch shown in Figure I varied greatly in thickness and its elastic tissue layer was almost entirely lacking. In the figure the vessel is shown at a point where it is still attached to the communicating artery. The great contrast between the two vessels is shown most strikingly in the difference in the elastic tissue layer and in the rupture of the wall of the diseased vessel."

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Case 4. A fourteen year old schoolboy was admitted on January 23, 1931. Two days previously he had awakened with a slight frontal headache which persisted throughout the morning. About midday, following a brief period of amnesia, he suddenly collapsed in a coma. He was seen almost at once by the school physician who was impressed with his extreme respiratory distress evidenced by gasping for breath and slow spasmodic breathing. Death seemed imminent. The patient was put to bed and given strychnine hypodermically. When he was seen a few hours later by a consultant he was still comatose with a respiratory rate of 50 per minute. Cyanosis of the lips and extremities was obvious. The pupils reacted sluggishly to light and the conjunctival reflex was almost gone. Numerous bubbling rales were heard throughout both lungs and the patient had coughed up some blood-tinged serous fluid. The heart was heard with difficulty but seemed normal. The pulse rate was 80. The patella reflexes could not be satisfactorily obtained. The consultant made a diagnosis of pulmonary edema and administered adrenalin. He advised complete rest until the patient was in better condition for transportation. During the next two days the patient vomited several times but his respiratory and mental symptoms improved.

He was sent to the hospital two days after the onset. At this time he seemed fairly well oriented but looked very uncomfortable. He complained of a violent headache. There was a slight but very definite stiffness of the neck and spine and a vague suggestion of a positive Kernig's and Brudzinski's signs. The other reflexes were normal and there was no evidence of paralysis. The fundi appeared normal. X-rays of the skull were essentially negative. The white count was 13,600 but there was no albuminuria. The temperature by rectum fluctuated between 100.8° and 102.2°.

On the fourth day of the illness a lumbar puncture was done. The fluid was under more than 350 mm. pressure and was homogeneously bloody. The supernatant fluid after centrifugalization was definitely yellow. Only 5 c.c. of fluid were taken off at this time because the patient complained of a "funny sensation in his head." The blood and spinal fluid Wassermanns were negative. His condition was unchanged for the following six days during which time he required narcotics for the control of his headache. On the ninth day another puncture was done and the initial pressure was 280 mm. Twenty-five c.c. of fluid were removed and the final pressure reading was 105 mm. After this the patient was very much better and had no further headache. He continued to improve until discharged on February 17th, four weeks after onset, at which time physical and neurological examinations were normal. During the past seven months he has been entirely well.

The question arose whether the illness might have been the result of a cranial injury since the patient had been subjected to more than his share of rough treatment at school. Careful inquiry, however, failed to substantiate this theory and the patient's account of the onset definitely indicated that he was in a state of amnesia for some minutes before falling.

Summary

Spontaneous subarachnoid hemorrhage is apparently not a rarity although it has been neglected in American literature until recent years. It may occur at any age and is relatively common in young people. There are many possible causes for its occurrence but a congenital cerebral vascular anomaly is probably responsible for more cases than any other single cause. Its onset is usually very abrupt. The symptoms are those of a combination of mechanical pressure and meningeal irritation. A homogeneously bloody spinal fluid is always present. The immediate prognosis is grave and recurrences are not uncommon. The treatment consists of controlling the intracranial pressure and removing the irritating fluid when necessary.

Of the four cases presented, a definite etiological diagnosis of a congenital vascular anomaly was established by necropsy in the only fatal case (Case 3). This diagnosis seems most probable in two others (Cases 1 and 4) and in the remaining one (Case 2) it may well have been the cause. All four cases were characterized by the abrupt onset of coma in otherwise healthy persons, three of whom (Cases 1, 3 and 4) were under thirty. Headache, mental confusion and signs of meningeal irritation occurred in all those surviving (Cases 1, 2 and 4). In three instances (Cases 1, 2 and 3) evidence of increased intracranial pressure was obtained. Two (Cases 3 and 4) suffered from respiratory failure presumably due to a medullary compression. All the spinal

fluids were homogeneously bloody and fever was a constant finding. Leucocytosis was present in the three cases (Cases 1, 2 and 4) where a white count was done and albuminuria, transient in character, was demonstrated in the two cases (Cases 1 and 2) where a urinalysis was performed within twenty-four hours after onset. There was no glycosuria in this series. Evidence of syphilis was lacking in all four. Therapeutic lumbar puncture apparently gave definite relief from meningeal symptoms in the three (Cases 1, 2 and 4) where it was used. Caffeine seemed to relieve the respiratory failure of the fatal case. The three survivors (Cases 1, 2 and 4) are at present without signs or symptoms attributable to their illness.

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BACTERIAL ALLERGY AND CHRONIC ARTHRITIS.*

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The problem of therapy in chronic arthritis is rendered difficult in that in the last analysis we do not know its actual etiology and are therefore not yet in a position to remove the cause. This is, after all, the ultimate desideratum in the treatment of any disease.

Opinion is still divided as to whether arthritis is metabolic or infectious in origin. Furthermore, those who hold to an interaction of the two factors are not in agreement as to the preponderant value of the one or the other. Certainly metabolic factors do play a part. Pemberton and his colleagues[1-2] have observed delayed removal of sugar from the blood and diminished oxygen utilization in chronic arthritis. Sulphur metabolism appears to be altered. Cawadias[3] has observed an excessive loss of sulphur in the urine. Not infrequently the blood calcium is elevated.[4] The urine of persons with atrophic or rheumatoid arthritis is usually dilute, indicating a deficient concentrating capacity of the kidneys.[5] The frequent onset of rheumatism at or near the menopause is further evidence strongly suggestive of the action of metabolic factors. In this connection the thyroid and the gonads, particularly the ovaries, have received especial study.

The tendency of arthritis to run in families likewise suggests a metabolic factor, but against this it has been pointed out[6] that as a rule children of arthritic parents are brought up in an identical environment, which is often auspicious to the development of the disease.

The situation is further complicated by the fact that aside from the specific arthritides there are at least two forms of chronic arthritis: atrophic (called rheumatoid arthritis in England), and hypertrophic arthritis (called osteoarthritis in England). Often the two appear in the same individual. The former usually appears earlier in life. It is more likely to involve the smaller joints, and is usually thought of as infectious. The latter occurs later in life, is more likely to involve the larger joints, is less disabling and is considered by many to be primarily metabolic or traumatic.[25] There are decided differences in the gross and microscopic pathology of the two forms, but there are at the same time many points of pathological identity and some authorities, such as McCrae[7] and Crowe,[8] believe that they are but different manifestations of a basic underlying pathological state.

The idea of an infectious factor in the causation of chronic arthritis received great impetus with our understanding of focal infection, and the occasional spectacular relief following the removal of such foci. Bacteriologic investigations of this chronic disease have to an extent paralleled those that have been made in the more acute rheumatic fever. These investigations have developed many points of analogy between rheumatic fever and chronic arthritis and have led many to believe that the basic underlying process, if not the actual

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etiologic agent, is identical in the two. In both, however, the search for a single specific etiologic bacterium has so far been surprisingly fruitless. Attention has centered increasingly around the streptococcus. Specific streptococci, such as Poynton and Paine's diplococcus rheumaticus,[9] Small's streptococcus cardioarthritidis,[10] Crowe's streptococcus rheumaticus,[8] and Birkhaug's non-methaemoglobin-forming streptococcus[11] have been proposed as the specific agent.

It beomes at once apparent that if these different streptococci are not identical, either they cannot all be the causes of rheumatism or else rheumatism may be caused by a variety of streptococci. The streptococcus found most frequently in conjunction with rheumatic fever belongs to the viridans group. But, even so, it is not constantly present. Swift and Kinsella[12] recovered nonhemolytic streptococci from the blood in less than ten per cent of their rheumatic cases. Although Clawson isolated streptococcus viridans from all of twenty cases, he found them not to be immunologically identical. Cecil, Nichols and Stainsby[14] obtained streptococcus viridans, streptococcus hemolyticus and streptococcus anhemolyticus, all, from the blood of patients with rheumatic fever. Observations such as these have been the basis for the multiple streptococcal theory of acute rheumatism. Apparently a variety of immunologically different streptococci may be responsible for the clinical picture.

An explanation for the similarity in the clinical response, in spite of multiple streptococcal etiology, was soon made available by the work of Swift and his collaborators[15] on allergy to the streptococcus in rheumatic fever.

Derick, Andrews and Swift[16] produced a state of hypersensitiveness in rabbits by means of focal streptococcal lesions, a state which was demonstrated by positive intracutaneous sensitization reactions. Dochez and Stevens,[17] also Birkhaug,[18] confirmed this work and further showed that hypersensitiveness, which is at first specific for the infecting organisms, later becomes more general, so that one will react to different types of the same germ. This would suggest the possibility that once one has become rheumatic, due to sensitization to a single strain of streptococcus, other strains may be responsible for continuation of the symptoms.

Swift and his collaborators also showed that clinically many rheumatic patients give positive skin reactions to filtrates of certain strains of streptococcus viridans.[15] Apparently positive skin reactions in rheumatic patients depend more on a state of hypersensitiveness to certain products of streptococci than on the specificity of any one type of streptococcus. A focus of infection in a rheumatic individual becomes an area where the allergizing substance is produced, and whence it spreads to sensitize the different tissues. This is more likely the basic process at work than that of the older theory, that the focus serves as a point from which organisms are disseminated throughout the body. This would explain the very frequent failure to isolate viable organisms from the joints themselves.

In chronic arthritis, as in acute arthritis, the streptococcus appears to be the offending organism. Both viridans and hemolyticus have been isolated from the joints, the lymph nodes, and the blood.[6]

The idea that chronic arthritis, like acute rheumatism, is associated with allergy to the invading microorganism, even though the bacterium itself be also present in the joint, has been stressed especially by Small,[19] in this country, and by Crowe,[8] in England.

Report of Studies

Since in the last analysis proof or disproof of the theory will depend upon the results of clinical investigation, we have, during the last four years been studying the results of bacterial desensitization in a series of patients with chronic arthritis. Both atrophic and hypertrophic arthritis are represented, roughly in the proportion of four to one. So that we might evaluate the results of vaccine treatment, this has been almost exclusively the only therapy administered. Occasionally, in the absence of relief, we have employed other measures, but in the compiling of our statistics such cases have been recorded as poor result cases. With certain modifications, we hav followed the procedure developed by Crowe. In general, the principle and plan has been as follows:

Except in very early cases no special attempt was made to clear up foci of infection. In a large proportion such attempts had already been made without relief. In any event it is usually impossible to clear up every focus. Cecil and Archer[20] have observed that where an arthritis is of longer than one year's dura-

tion, such therapy is less likely to be productive of relief, and Pemberton and Pierce[21] have observed that in cases of chronic arthritis in which local foci were present the number of recoveries was three times greater when the foci were allowed to remain than when they were treated. Furthermore, such a procedure would have left us unable to determine the value of vaccine treatment.

The vaccines used were made from the organisms cultured from the feces, following the Solis-Cohen selective pathogen technic. Crowe has remarked that after a focal infection has become sufficiently established to produce chronic arthritis, the same organisms are usually also present in the colon.

The intestinal tract has always received especial attention in studies of the etiology of rheumatism. It has been shown that diminished acidity in the upper gut diminishes the disinfecting power of the upper intestinal tract. Arnold and Brody[22] have observed experimentally that sudden atmospheric changes (high temperature and humidity) inhibit the bactericidal action of the intestines. These investigators introduced cultures of B. prodigiosus, B. coli and B. typhosus into the duodenum, together with an alkaline solution and protein (eggwhite), and observed that within from five to thirty minutes the lymph in the thoracic duct contained from 500 to 1,000 bacteria per c.c. These observations strongly suggest that gastrointestinal disturbances and meteorological changes may increase bacterial absorption from the intestines. Keating[23] has found hemolytic or nonhemolytic streptococci in the stools of ninety-five per cent of his chronic arthritics as contrasted with ten per cent among nonarthritics.

Vaccines Used

Our vaccines have been of three different types. By preference we have used an autogenous fecal vaccine which we have termed enteropathogen. When this has failed to give desired results we have had recourse to a pooled enteropathogen, consisting of a mixture of those various autogenous pathogens which we have found to give best results in other cases. Our third vaccine has been Crowe's stock or pooled vaccine which contains the streptococci and staphylococci which he has isolated from individual cases. It represents 155 varieties of streptococci and two of staphylococci. On the whole we have obtained better results from our autogenous vaccines, but when these have failed one or the other of the two alternative vaccines has sometimes given relief.

The technic of administration has been based on the assumption that we are dealing with bacterial allergy rather than with bacterial immunity, and the dosage has been analogous to that employed in desensitization to pollens and to allergens.

I believe that much of the failure from vaccine therapy in arthritis and other allergic diseases has been due to a failure to recognize the difference between desensitization and immunization, and the consequent use of excessive dosage.[24] Our doses have always been minute, and as soon as improvement has become manifest the size of the dose is never increased, as long as improvement continues.

Dosage

The criteria of dosage have followed those laid down by Crowe. An arbitrary small first dose is given. If within the next twenty-four or forty-eight hours the patient feels better, the dose is probably correct and should be maintained comparatively steady. If during this same interval the arthritic symptoms become worse, the dose was too large and should be reduced. If there was neither response nor reaction, assuming that we have the proper organism in the vaccine, the probability is that the dose was too small and it is stepped up accordingly.

Treatments are given at intervals of four, seven or ten days, depending upon response and must be kept up for many months. The exact duration of treatment for best results is still uncertain.

Results

We have recently concluded a follow-up survey on our first hundred cases so treated, extending over a period from 1926 to 1929. We had thought that these cases had gone a sufficiently long period to justify statistical study. We find that of these, ten per cent were relieved of symptoms, probably best called quiescent or arrested; thirty-seven per cent were very much improved; twenty-five per cent were benefited somewhat but not sufficiently to be called satisfactory; and the remainder were not benefited. Thus, we find that forty-seven per cent were sufficiently relieved to be well satisfied with the treatment. When we consider the chronicity of arthritis,

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its tendency to relapse and the failure of the usual methods of treatment to give more than evanescent symptomatic relief, these figures assume real significance. They are not quite as good as those of Crowe, who reports good results in sixty-eight per cent, and this leads to hope that our results can be still further improved.

The difficulty with judging results following any method of treatment is that apparently equally good results may be obtained by entirely different methods.

Thus, Pierce reported success in seventy-one per cent of his arthritics by restriction of the diet together with general treatment, while Hall obtained nearly as good results (sixty-six per cent), by giving a generous diet together with general treatment.[6] But, here, the common denominator is the general treatment and the obvious conclusion should be that the dietary regimen is of secondary importance. In our series, without exception, there has been no general treatment such as physiotherapy, baths and the like, so that, after discounting the psychic factor, what improvement there has been can be attributed only to the vaccine. Our estimate of the degree of relief has always been the patient's own estimate rather than ours, and we have allowed sufficient time for the patient's enthusiasm in a new procedure to have worn off.

It seems entirely reasonable to assume that a combination of the allergic treatment with other recognized general measures would materially increase the benefit gained; but for this study such a combination would have discredited our conclusions. However, in the practical treatment of the patient with chronic arthritis, the logical procedure should be a combination of specific bacterial desensitization, with general therapeutic measures such as low carbohydrate diet, vitamin B feeding, intestinal cleansing and physiotherapy. We cannot lose sight of the fact that infection is undoubtedly but one of several factors which interact in the production of the arthritic constitution.

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DISCUSSION

DR. ----------: Infectious arthritis has rather interested me lately. If I might add a word, I should like to say that in these cases that do not seem to react to vaccines, foreign proteins, etc., I have had a series of transfusions give the desired pick-up to some of these cases.

DR. RUSSELL L. CECIL (*invited guest*), *New York City:* I was very much interested in Dr. Vaughan's paper. I think he is presenting a new point of view and one that we are all anxious to hear about. This whole question of allergy, of course, has been much discussed in relation to tuberculosis and in relation to arthritis. I believe bacterial allergy plays an important part in the pathogenesis of rheumatoid arthritis. I cannot accept the theory that arthritis is a metabolic disease, and I doubt if you will find many medical authorities who will say it is a metabolic disease. I doubt if you will find a professor of medicine or a pathologist or a bacteriologist that will say rheumatoid arthritis is a disease of metabolism. Many will say it is an infectious disease, and some will not say anything. I think nearly all students of arthritis, certainly in this country and in Germany and England, consider it an infectious disease. What causes arthritis in pneumonia? The pneumococcus when it gets into the joint. Why deny this privilege to streptococci? By analogy it seems perfectly possible.

DR. VAUGHAN, closing the discussion: I want to thank Dr. Cecil for entering into the discussion. Because Dr. Cecil had covered the subject of etiology in the paper which he has just read, I omitted reading that portion of my paper dealing with infection as the probable cause of atrophic arthritis.

The one person I think of particularly who stresses

the importance of metabolic factors in both forms of arthritis is Dr. Pemberton. Dr. Pemberton, in his monograph, does not commit himself for or against infection. He discusses the work of Rosenow and Russell Headen, particularly in the earlier part of the monograph and then drops the subject. Isn't that right, Dr. Cecil?

DR. CECIL: I think so.

ABDOMINAL DRAINAGE.*

SOUTHGATE LEIGH, M. D., F. A. C. S., Norfolk, Va.

Can the formation of intestinal adhesions be materially delayed? We believe it can.

The generally accepted opinion among surgeons is that "shutting off" adhesions will form in a few hours around any drainage material placed in the abdominal cavity and that free drainage will automatically cease in a short time.

We believe that we have succeeded in keeping up such drainage for a considerable length of time, probably as long as five days. Having had repeated demonstrations of this prolonged drainage and appreciating the practically unanimous opposite opinion of the profession, we have had the literature searched by the American Medical Association, American College of Surgeons, and W. F. Prior and Company. We have been able to find only two authors who have written anything that has any bearing on the subject. They are Dr. J. R. Buchbinder, who in a series of experiments with animals made use of hypertonic dextrose solution to delay the formation of adhesions, and the other Dr. Harold M. Trusler, who uses amniotic fluid to prevent the formation of adhesions in abdominal surgery. I have corresponded with both of these gentlemen and find them much interested in the subject.

Dr. Buchbinder has conducted experiments with dogs and felt very hopeful. So far, however, he has not felt encouraged in using dextrose solution in human peritonitis. His investigations are being continued.

In the work of Dr. Trusler, his efforts have been exerted in the prevention of adhesions following operations. After reading a reprint which I sent him on the subject of abdominal drainage he wrote me as follows:

"I do know that following abdominal operations I employ intravenous fluids freely and at the slightest provocation. To this practice I give the credit for many spectacular recoveries. And I have personally noted the *free fluid drainage* which will follow such management of an abdominal suppuration. Concerning an effect on the prevention of adhesion formation, I have no specific data to offer but I certainly appreciate the soundness of your views.

"Some of my observations on the amniotic fluid product are interesting in this connection. In my attempts to determine the mechanism of its action I was always impressed that it acts, in part at least, by producing in the traumatized or contaminated peritoneum a fluid exudate which persists over several days time."

Dr. Trusler's letter is most encouraging in that it to some extent confirms my opinion as to the effect of adding fluid to the circulation and thus increasing the amount of drainage from the tubes. It is also interesting to note that a preparation made from amniotic fluid has been helpful in delaying the formation of adhesions following abdominal operations. It is to be hoped that it may be used effectively in suppurative cases.

I am frank to say that I have been rather surprised and shocked to find that so important a matter has not been given more attention by the profession in general. It rather reminds me of the opinion that prevailed, not so many years ago, that free pus in the abdominal cavity meant a fatality. Fortunately the profession did not so readily acquiesce in that opinion.

There are many cases of free pus in the peritoneal cavity, which needs draining out, and many of these cases have the pus so widely distributed that it is impossible to place drainage material at each infected spot.

If the "shutting off" adhesions of the intestines and other viscera can be delayed long enough, the pus may be induced by gravity and other means to run to the drainage tubes and be safely carried off.

The large majority of these cases are from appendicitis with rupture, occurring before limiting adhesions have formed. Wounds of the intestines and ruptured infected conditions may also cause pus in the free peritoneal cavity.

The Fowler position with the Murphy drip has been in general use for many years. A proper criticism of the former is that the drainage must be "up-hill." This objection can be overcome by placing the patient in the "elevated right side" position, so that if tubes

*Read before the sixty-second annual meeting of the Medical Society of Virginia, at Roanoke, October 6-8, 1931.

are inserted into the lower abdomen and pelvis, the outer ends of these tubes will be "downhill." These tubes should be of rubber, soft enough to do no damage to the surrounding parts, and thick-walled enough to prevent collapse. They should also be sufficiently large.

The delaying of the formation of the "shutting off" adhesions is brought about by *overfilling the blood vessels of the abdomen and pelvis with fluid.* They can be so over-filled that the peritoneal surfaces will become excreting instead of absorbing surfaces.

This is done by getting fluid as rapidly into the rectum as will be absorbed, and, if necessary, giving fluid under the skin or into the vein.

This filling of the blood vessels must begin *promptly* either during or immediately after the operation, and be continued *without interruption*, as long as necessary.

Salt solution is probably the best preparation for both rectum and subcutaneously, while salt solution or glucose may be used in the vein.

In demonstration of the efficacy of the "elevated right side" position, we can mention cases where the dressings are kept continuously soaking wet by the discharge from the tubes, and yet when we change the gauze wicks in the tubes every twelve hours, and use suction for any fluid in the bottom of the tubes, there is no fluid found.

In confirmation of our claim that adhesions are delayed and that the peritoneal surfaces become excreting surfaces, we would say that there is in these cases an increase in the amount of the fluid discharging from the tubes for the first two or three days and that the pus becomes gradually thinner.

We have now had over a hundred of these cases and, with the exception of four moribund cases, we have been able to obtain safe results. If any of our auditors are good enough to try the method, we would be grateful for a report as to the results.

Sarah Leigh Hospital.

SOME FACTORS IN THE ETIOLOGY OF VASCULAR HYPERTENSION.*

PHILIP S. SMITH, M. D., F. A. C. P., Abingdon, Va.
Johnston Memorial Clinic.

When the subject of this symposium, vascular hypertension, was mentioned in the presence of an experienced, active clinician, his remark was: "What can be done for it when recognized?" Admitting the relative truth of his pessimistic observation, the fact that so little is known regarding its cause, pathology and treatment should prove an incentive to further study. Those of us who have had no special training and opportunity for research work can exchange profitably clinical impressions and observations about a malady so prevalent. Research work in this field, as in others, is indispensable, but theories and laboratory investigations not reinforced by clinical experience are usually unproductive of practical results.

We occasionally hear statements made that hypertension is a modern disease—a product of the strenuous civilization in which we live. The observation is doubtless incorrect. The sphygmomanometer is comparatively a new instrument, but early medical history describes symptoms and signs found in nephritis, arterial thickening, cardiac changes and apoplexy which, then as now, must have been associated frequently with blood pressure elevations.

The etiology of hypertension is not known. My purpose will be to discuss briefly some of the factors currently regarded as contributory, directly or ultimately. The voluminous literature dealing with the subject renders a bibliographic review impossible in this paper.

Races:—High blood pressure does not appear to be a characteristic of the Anglo-Saxon peoples exclusively. Gentile, Jew, Slav, Gallic and Latin have it in common. No records are available of savages, but hypertension is found infrequently in the Chinese and other Orientals. It probably reflects the stoical temperament of those races. Conversely, it is significant that people of less stable dispositions show a much higher incidence of hypertension. Probably the enervating temperature and barometric conditions of tropical countries favor relaxation of the vasomotor system.

Occupation:—It has long been observed that certain vocations are conducive to the development of increased blood pressure. Osler called attention to the influence of prolonged muscular effort. Doubtless the temporary compensatory increase of vascular tension incident to violent physical exertion, if continued as a daily feature of one's work, may result in permanent changes in the arterial tree and cardiac muscle.

*Read by invitation as part of a symposium on Vascular Hypertension before the Clinch Valley Medical Society, Gate City, Va., September 30, 1931.

On the other hand, a sedentary life, particularly in those who have been active previously, oftentimes results in obesity with its frequently associated cardio-vascular-renal changes and hypertension. This is illustrated in the experience of many famed athletes after increasing years have enforced an abandonment of active daily exercises.

Painters, typesetters and other workers in lead are prone to gradual arterio-sclerosis and elevation of pressure. The daily absorption of small amounts of the metal apparently causes metabolic changes resulting in nephritis, gout, etc.

Focal Infections:—Possibly undue emphasis has been ascribed during the past two decades to isolated foci of infection in the etiology of many diseases. All of us have encountered numerous instances where teeth have been radically extracted, tonsils enucleated, and nasal sinuses operated without sufficient provocation and with clinical results disappointing to both patient and physician. A causal relationship between focal infection and high blood pressure has not been proved. Yet, there is general recognition of the beneficial effects frequently resulting from the complete eradication of definite foci of infection in arresting and ameliorating certain hypertensive states. Too often the clinical results are minimized because of a failure to effect a complete "house-cleaning" when more than one compartment is involved with bacterial debris. It is confidently believed that the more generally practiced examination of school children, and the correction of such focal lesions, will result in a reduced incidence of the states conducive to hypertension.

Diet:—Habitual over-eating with resulting abnormalities of metabolism, especially in the obese, is regarded as an important contributing factor in high blood pressure. So general is this opinion held that we recognize the potential subject of apoplexy and cardiac dilatation in the fat, plethoric gourmand seen in public dining rooms. Medical directors of life insurance companies are impressed with the frequent association of obesity and hypertensive changes in adults at, and beyond, middle life. Such applicants for insurance pay dearly for their intemperance, not only in settlement of the dinner check, but in increased insurance premiums. Unfortunately, in such matters, the physician's mandates are frequently as ineffective as legislative enactments affecting personal habits.

Various types of food have been the subject of much controversy in this connection. Proteins especially have been thought to be a factor in elevated blood pressure. The arguments supporting such a relationship are not convincing, provided the kidneys are able to eliminate satisfactorily urea and other ashes of protein metabolism. Carnivorous animals and races like the Eskimos, whose diets consist chiefly of meats, are not recognized as frequent victims of hypertension. Recent experimental tests made by Arctic explorers in living for months on a diet almost exclusively protein failed to reveal evidences of vascular and renal lesions—found by Newburg in animals experimentally fed high protein diets.

Sodium chloride is believed by some to be responsible indirectly for such changes, but, again, proof is lacking in individuals whose kidneys readily eliminate the salt.

The body's water intake has been subjected to interesting experimental and clinical study. Water "intoxication" has been shown to increase the blood volume and in certain conditions, such as diabetes insipidus, occasionally may cause vascular hypertension and convulsions. In patients with chronic nephritis, especially with edema and hypertension, excessive amounts of water are definitely injurious. Ordinarily in health the harmful possibilities are negligible since the kidneys and other emunctory organs maintain a safe water balance.

Alcohol, also, has been thought an etiological factor, not only in hepatic cirrhosis, but possibly in nephritis and hypertension. Its role in the latter conditions remains open to question.

Blood pressure determinations made on a large number of tobacco smokers showed a transient rise of about 5 m.m. of mercury when a cigarette was smoked. Excessive use of tobacco is thought to be a possible factor in initiating certain types of cardiac angina and obliterative endarteritis.

Metabolic Disorders:—Much attention has been directed in recent years to the endocrine system in its relation to blood pressure disturbances. We are familiar with the hypotensive changes expected in Addison's disease and myxedema. Thyrotoxicosis, especially the exophthalmic type, is usually associated with an

elevated systolic pressure and a normal, or low diastolic level. The subcutaneous or intravenous injection of epinephrin stimulates the vaso-constrictors with a temporary elevation of pressure. Possibly the thyroid hormone produces a similar effect on the sympathetic system.

The frequently encountered hypertension in women of menopausal age has been investigated extensively. With the waning ovarian function, it appears that antagonistic, or controlling, hormones of other ductless glands may be responsible for vaso-motor abnormalities, including high blood pressure.

Sir Humphry Rolleston states: "Chronic inefficiency of the liver to deal with the metabolism of proteins has naturally been assumed to be a cause of high blood pressure, and Sir Clifford Allbutt, in his posthumous work on arteriosclerosis (1925), accepted the possibility of the formation, or imperfect destruction, of a pressor amine. Guanidine* compounds and more recently a pressor hormone isolated from the posterior lobe of the pituitary gland have their advocates.

These and other metabolic disturbances are regarded by many as potential factors in the so-called "essential hypertension." In the absence of cardiorenal changes and arterio-sclerosis it is believed that the peripheral arterial tree (arterioles) are maintained in a state of more or less constant contraction by a pressor substance probably endogenous in origin. If this be true, the increased resistance offered to the column of blood during ventricular systole, and the diminished relaxation of the vessel walls during diastole, plausibly explains this interesting clinical phenomenon. Many of these patients, however, in later years show definite evidence of nephritis, arterio-sclerosis and cardiac hypertrophy.

Psychic States:—The increased incidence of hypertension in several generations of certain families has given the impression that heredity exercises a direct etiologic role.† However, it seems probable that the environmental influences prevailing in the home and the characteristic temperament of one or both hypertensive parents may be an even more important factor in the frequency of familial high blood pressure.

The type of individual in whom hypertension either exists, or seems probable in the future, is fairly well recognized. The intensive, over-conscientious boy or girl, systematic even in inconsequential matters; the young adult who has early acquired the habits of thought and conduct of the middle aged, and the individual who has attained "success" at the expense of relaxation and play—these constitute a large percentage of patients with vascular changes.

Nephritis and Arterio-sclerosis:—Until recent years the term "high blood pressure" was usually regarded as synonymous with Bright's disease and atheromatous changes in the vessel walls. All of us, however, have observed certain patients with definite hypertension over a period of years whose kidneys and arteries apparently have remained uninvolved. Conversely, others are encountered frequently with advanced sclerosis of kidneys and blood vessels with no increase of blood pressure. The unknown factor, or factors, in such clinical equations has so far escaped solution. Yet, it is obvious that chronic nephritis and arterio-sclerosis are important etiologically in elevated blood pressure, or else the hypertension is a frequent expression of the renal and vascular diseases. The distinction is not one of importance clinically. Emphasizing the relationship between nephritis and hypertension, MacLean states that "the prognosis in many cases of raised blood pressure is dependent to a great extent on the renal condition."

Transient hypertension at times is seen in patients with acute nephritis. Like the fever and albuminuria, the pressure usually declines with the disappearance of the edema and the subsidence of the inflammatory process. Moschcowitz and others believe that glomerulo-nephritis is not a disease limited to the kidneys, but "represents a generalized disease of the capillaries,—a capillaritis." He states that Müller, Wolheim and others have found definite changes in the base of the nail bed consisting in irregularity of outlines, swelling, tortuosity of the vessels, and retardation of blood flow.

The all too frequent complication of the later months of pregnancy constitutes an important group of hypertensive cases. The toxemia in such patients suffering with grave

*Major states: "Many patients with essential hypertension do not, as commonly stated, have a normal kidney function. They are unable to excrete normally two guanidine compounds,—methyl guanidine and creatinine.

Major and Weber found increased amounts of guanidine in 50 observations on patients suffering from arterial hypertension, including 6 cases of frank nephritis.

†Osler is credited with the statement that such patients apparently are born with defective "tubing" (arteries).

renal disturbances is not definitely known. The condition is something more than an acute nephritis. The elevated blood pressure, edema and abnormal urinary findings usually disappear promptly after delivery. Occasionally the kidney pathology and increased arterial tension continue after the puerperium.

A consideration of the probable causes of chronic nephritis and arterio-sclerosis necessarily includes the factors, already briefly discussed, contributing to vascular hypertension.

Some cases of chronic Bright's disease can be traced to a preceding acute nephritis which recovered only in part and passed into the subacute and permanent types. In such instances, an active focal, or an acute systemic, infection should be borne in mind.

The sclerotic manifestations of tertiary syphilis, especially common in the proximal portion of the aorta, the aortic valves, coronary and cerebral arteries, are frequently associated with hypertension.

Diabetes mellitus of long duration apparently contributes to atheromatous vascular lesions and blood pressure elevation. In these patients obliterative changes in the peripheral arteries of the extremities, terminating in gangrene, are common occurrences.

Finally, it may be stated that the chief contributing cause of hypertension and sclerosis is the wear and tear of old age. Senility, with its attendant degenerative changes, cannot be prevented but can be deferred. Premature hypertension constitutes an economic waste and oftentimes deprives its victim of his heritage of maximal development and accomplishment.

European visitors frequently comment on the intensive habits of work in America. Our hurried lunches, daily races for subways and commuters' trains, stock exchange frenzy, and numerous distractions that interfere with sleep and relaxation are regarded as characteristic of our urban life. These doubtless are potential factors in provoking various psychoneuroses, early degenerative changes and hypertension. This increased speed and tension of living, however, is being neutralized in part by the prevalent tendency of the American people to indulge to a larger extent in play and recreation. The automobile and good roads afford more time and opportunity for travel, and sports of various kinds are no longer exclusively the privilege of the young. If the tired, successful business and professional man has contributed in the past to increasing mortality of cardio-vascular diseases, it may be that the next generation will profit by their experience with resulting greater longevity.

In conclusion, it may be said that the problem of hypertension is apparently insoluble in the light of our present knowledge. For the time being we must regard it as a symptom rather than a definite clinical entity. Its causes, doubtless, are as numerous as such symptoms as headache or vertigo. The admission of ignorance of its etiology constitutes a wholesome state of mind and is conducive to further rational investigation. A science that has unraveled, wholly or in part, such clinical puzzles as diabetes, pernicious anemia, pellagra, rickets, and many infectious diseases will not supinely admit defeat in this instance.

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TRANSURETHRAL RESECTION OF THE PROSTATE: REPORT OF CASES.

W. CALHOUN STIRLING, M. D., F. A. C. S., Washington, D. C.

There is no subject before the urological world today that has created as much comment as has the discussion concerning the relative merits of instrumental prostatectomy. This is due in no small part to the brilliant work done by Young, Caulk, Davis, McCarthy and others. Caulk says: "Any radical departure from the commonly accepted tenets of medical or surgical practice in the past has been severely combated so that any new procedure to justify its favor in the profession must fulfill certain unquestioned requirements." It is becoming increasingly evident that resection does fulfill certain of these requirements. A sufficiently large number of cases have been reported and observed over a sufficient period of time to permit one to make an estimate as to the relative merits of this method as compared to the open operation. Young has used

his cold punch in well over three hundred cases; Caulk has reported a large series of cases with no deaths directly attributable to his punch operation; Davis has had 360 cases in which his instrument was successfully used with but two deaths. J. F. McCarthy has resected a large series with but one death, while Engel, at the Crile Clinic, Kirwin and others have reported similar series of cases, so that the total aggregate runs well over a thousand cases with a very low mortality. Even the most optimistic advocate of other methods of removal of prostatic obstruction cannot boast of anything approaching this very low mortality. T. D. Moore, in a recent paper on this subject, asked whether prostatectomy is to become obsolete since the advent of the transurethral method. One might well answer in the affirmative in Grades One, Two and Three of prostatic enlargement, but not in the large vascular group of obstructions. However, only in the last decade has the open operative mortality rate been reduced to as low as 5 per cent, and this figure only in the hands of the expert. Since it is generally agreed that an instrumental prostatectomy is much more difficult than the open route, there will be unfavorable reports doubtlessly made in the future by those unaccustomed to its use. Young and Bumpus have shown that contractures at the bladder outlet, median bars and small median lobes can best be handled by transurethral surgery. The only question is in what per cent of bilateral enlargement and large median lobes can this method successfully replace the open operation. Caulk is using it in 85 per cent of all prostatic obstructions; Davis is using it in about 90 per cent, except in those cases in which the prostate is so large, and the bladder capacity so reduced, that the space between the bladder wall and prostate is too small to allow a margin of safety. McCarthy is using it in a majority of all of his cases, as is Engel, at the Crile Clinic.

At the Boston meeting of the Urological Association in 1926, the writer became interested in the Collings method of removal of minor obstructions at the bladder neck with the electrotome used through the McCarthy panendoscope. An instrument was obtained at this time and used on this type of case. However, since the current delivered at the electrode was cutting in type and not coagulating, bleeding could not be adequately controlled. In 1927, Stern developed the resectoscope but this had the same disadvantage, i. e., lack of control of bleeding, causing its use to be abandoned. Davis has modified this instrument, enlarging the aperture, enlarging the cutting loop, and equipping it so that a coagulating current can be passed through the same electrode and thus secure hemostasis. In his hands it has been used in 360 cases with but few deaths directly attributable to its use.

McCarthy recently developed the new visual electrotome for the removal of obstructing prostatic lobes. He says that "canalization" of the urethra and not "excavation" is the goal sought, and it quite suffices to cut through the obstruction, restoring the urethra to its normal calibre. We have all seen the frequency with which prostatic engorgement rapidly subsides with an actual diminution in the size of the gland following preliminary suprapubic cystostomy. This results from relief of the bladder tenesmus and straining with a diminution of the intracapsular tension of the prostate.

Caulk believes that a large portion of these obstructions are inflammatory hyperplasias and not neoplasms, and therefore it is not necessary to remove the gland completely but only to remove the obstructing portion. Sections taken from glands after removal have confirmed this viewpoint, as well as have the opinions of other observers.

One of the chief criticisms heard about instrumental prostatectomy is that it does not do a complete prostatectomy. That this is not necessary has been pointed out by all those operators who use the transurethral method. As Randall points out, capsular tension is a more important factor than the increased size of the gland in producing prostatic obstruction, and asks, "is it not better to subject an old man to a minor surgical procedure rather than to an actual prostatectomy?" Section of the fibrous bar ofttimes relieves the obstruction. The point most discussed and emphasized in this interesting though highly technical procedure is that it is a preventive surgical measure. By educating all men of prostatic age to seek medical aid before cardiovascular derangement occurs, as is found in 45 to 50 per cent of all prostatics, back pressure on the bladder, producing diverticula, stones and serious derangement of the renal system may be avoided. The ideal procedure would be to get the patient when prostatism first asserts itself, characterized by nocturia, difficulty in stopping and starting the urinary stream, diminished

force and dribbling. At the time the obstruction is small and resection of the prostate is attended with little or no danger, the residual urine is relieved and the patient's health becomes markedly improved. Bumpus points out that all that is required in these cases is to remove the obstruction.

The patient to be resected must be given the *usual pre-operative treatment* which has so greatly lessened the mortality of prostatectomy. An indwelling catheter is used for decompression and restoration of the vital functions to their optimum capacity. Determinations are made of the blood nitrogen content, the excretory output of the kidneys, and a careful summary is made of the patient's general condition. The technique of transurethral prostatic resection with the Stern-Davis technique or with the McCarthy visual endoscope is performed under trans-sacral and caudal block, thereby avoiding the more dangerous forms of anesthesia in these old debilitated men. The patient having been placed in the usual cystoscopic position, the indifferent electrode is placed under the buttocks and he is draped with a sterile minor sheet. The resecting instrument is then introduced into the bladder. The bladder is then irrigated until the fluid return is clear, and after carefully adjusting the light and the generating current, the patient is ready for resection. The verumontanum is located as the anterior landmark and is at the apex of the prostate, the posterior landmark being the intravesical portion of the prostate. Figure 1 shows the instrument in place, the loop placed over the projecting portion of the prostate ready for resection. The loop works on a ratchet which describes a one-hundred-eighty degree circle, permitting the removal of a section one inch long and one-eighth to one-twelfth of an inch deep. The size of the pieces may be judged from Fig. 6. As many pieces are removed as one finds necessary to completely relieve the obstruction. Davis believes in removing as much tissue as is compatible with safety, while other workers believe that establishing a trough will cause the rapid shrinkage of the remaining portion of the obstruction. After the cut is made, any bleeding points *must be individually* fulgurated with the coagulating current and thus secure hemostasis. This improvement has done more than any other factor to make this operation a safe minor procedure, since formerly bleeding was its most dreaded complication. It is *imperative* to control bleeding all through the resection; otherwise, vision is impaired and one cannot see what structure is being sectioned. When sufficient tissue has been removed to return the urethral contour to normal and thus relieve the capsular tension, the resectoscope is removed and a No. 14 to No. 20 F. catheter inserted into the bladder through the sheath. The bladder is then irrigated to remove any pieces of tissue and continuous drainage instituted. The spark-gap unit undoubtedly affords much better and deeper coagulation than the "tube type," thus securing better hemostasis.

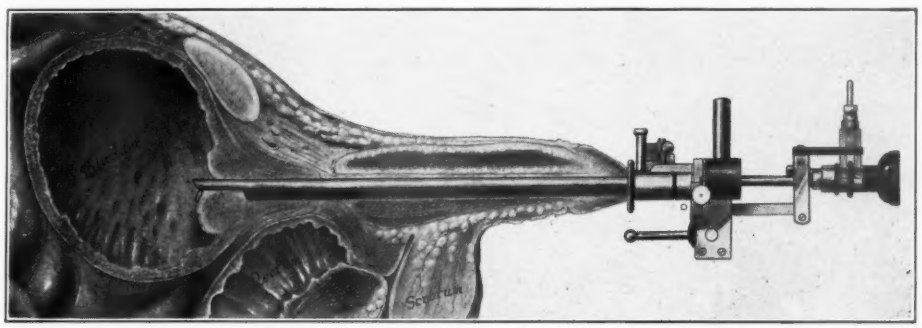

Fig. 1.—Sagittal section showing the electroteme in place ready for resection. Cutting loop is engaged with the obstructing portion of the prostate.

The most important point in the post-resection period is to secure free drainage as there is a marked tendency for secondary renal infection to occur, as happens in the open operation at the time the suprapubic fistula closes. This puts the bladder at rest and lessens tenesmus with its attendant hemorrhage. The catheter is left in place for from two to five

days. After its removal micturition is resumed, somewhat difficult at first, gradually improving as re-epithelization takes place and the infection subsides. The striking thing about this procedure is the absence of shock, seen when an attempt is made to dig out the prostate suprapubically will be obviated, although when metastasis has occurred any form of therapy is hopeless. Intra-urethral manipulation is especially indicated in keeping the

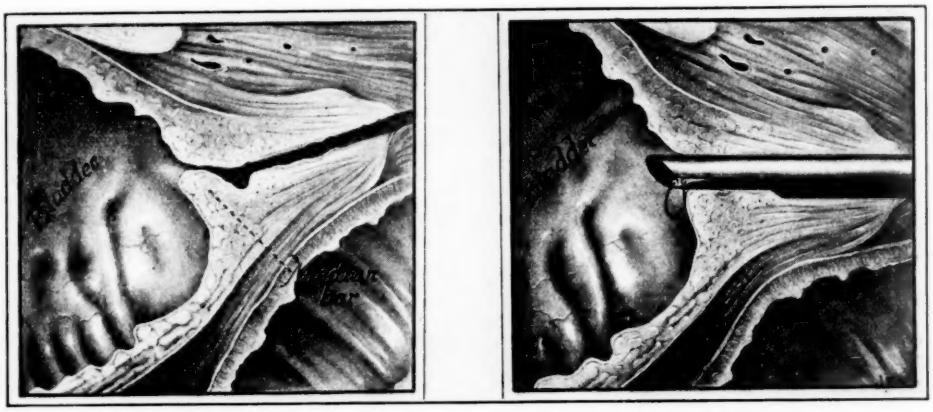

Fig. 2.—Medium bar formation shown at the left. The instrument is in place at the right with loop ready to excise bar. In this type of obstruction, resection is much superior to the open operation.

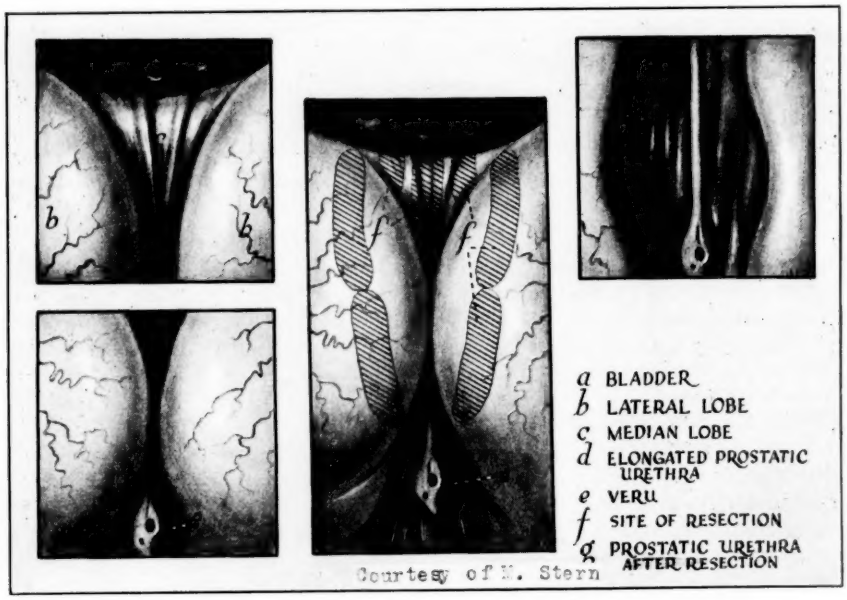

Fig. 3.—Topography of the prostatic urethra showing site of removal.

the decreased morbidity and rapid restoration of the urinary function.

Carcinoma particularly lends itself to this form of therapy. With trauma reduced to a minimum, the widespread metastasis so often urethral lumen patent, thus making the patient comfortable.

Intra-urethral obstructive conditions about the vesical outlet, such as tags, recurrence following prostatectomy, or scar tissue with con-

tracture following an operation, may be relieved by this method, provided the instrument can be introduced into the bladder.

The following case reports emphasize the points discussed in the paper:

Case No. 1: Mr. J. B., age 74, entered Georgetown Hospital December 5, 1931, with acute retention. I was called in consultation by Drs. Gannon and Behrend. A rectal examination revealed a type four prostate, symmetrical and smooth. The urethra was tortuous and elongated. A metal sound was required for catheterization, due to the obstruction. After the blood nitrogen and kidney excretory tests became normal following catheter drainage, resection of the prostate was determined upon. Following the first resection twenty-two grams of tissue were removed with very little bleeding. Due to the edema and marked sclerosis of the vessels. Rectal examination revealed a type three prostate, smooth, symmetrical, and showing no evidence of malignancy. Because prostatectomy was not deemed advisable, intermittent catheterization was practiced. A gradual improvement was noted for several months, after which the patient passed from our observation. In January, 1932, I was again consulted. The patient had a recurrence of his former symptoms in an aggravated form. Vesical lavage did not give any relief and the prostate gland was much larger on rectal palpation. A blood sugar at this time showed only 120 mg. with 18 mg. of blood urea. The phthalein output after intravenous injection was 20 per cent the first fifteen minutes, 10 per cent the second, and 5 per cent the third. Prostatic resection was advised and carried out on January 2,

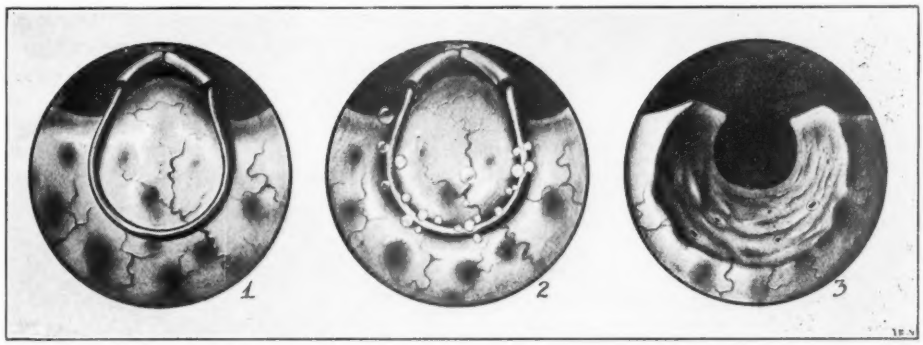

Fig. 4.—Posterior view showing the manner in which the electrode excises the obstruction. In the McCarthy technique the direction of the loop is forward, while in the Stern instrument it is backward. The figure on the right shows the obstruction following the resection.

congestion, too little tissue was removed so that it became necessary to do two more resections after intervals of five days. Following the last resection the patient's catheter was removed on the third day and he voided normally. There is no residual urine at the present time and the stream is normal in size, as is also the prostate gland as determined by rectal examination. The patient has gained in weight and is much improved generally. He was able to resume his occupation very shortly after his discharge from the hospital.

Case No. 2: Mr. T. J. S., age 84, was seen by me in consultation with Dr. Behrend in April, 1927. Chief complaint was difficulty in starting and stopping the urinary stream, diminished calibre of the stream, with increasing nocturia. At this time the patient's blood sugar was over 200 mg. per c.c., and there was

1932. There was no uncontrolled bleeding during or following the operation and the catheter was removed on the second day. When discharged on the fourth day after entrance to the hospital, the patient was able to void a normal stream and felt quite well.

Case No. 3: Mr. D. A. C., referred by Dr. W. P. Burns on December 14, 1931. Chief complaint was difficulty in voiding, dribbling and nocturia. Patient gave a history of a gradual increase in the symptoms for the past five years, terminating in acute retention on December 7, 1931. At this time an indwelling catheter was inserted and decompression instituted. After the blood urea and phthalein tests became normal a resection was carried out under sacral anesthesia. On December 21, 1931, eighteen grams of prostatic tissue were removed. There was very little bleeding dur-

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ing the resection, which was adequately controlled by fulguration. The catheter was removed on the third day and the patient was able to void, though somewhat unsatisfactorily. Three days later a cystoscopic examination revealed a few tags at the sphincter margin

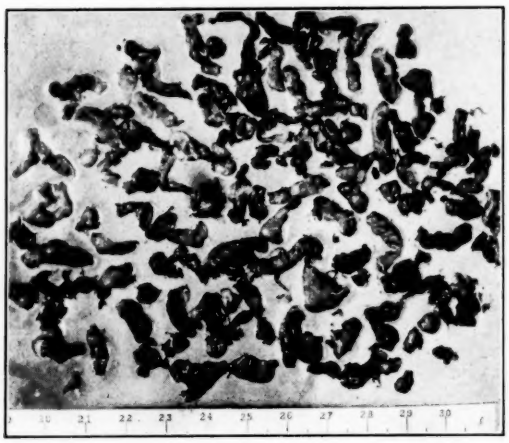

Fig. 5.—Prostatic tissue removed by resection. This weighed 28.4 grams. Sections made from this show an inflammatory hyperplasia with a mixed bacterial flora present.

which had not been resected. These were removed seven days following the first resection. An indwelling No. 24 French catheter was reinserted for three days. Following removal of this catheter the patient was able to void a good stream which has gradually improved until he now voids normally; he has no nocturia and no residual urine and was able to resume his occupation three weeks after his entrance to the hospital.

Case No. 4: Mr. W. S. A., referred by Dr. Sinclair Bowen; age, 64 years, entered the hospital February 10, 1932, complaining of difficulty in starting and stopping the urinary stream and nocturnal frequency. There were one hundred and fifty c.c. of residual urine. On rectal examination the prostate was found to be Grade Three, symmetrical and no evidence of malignancy noted. Cystoscopic examination confirmed these findings. The patient was treated daily with bladder irrigations for two weeks before entering the hospital, and was found to have a normal blood picture and a total phthalein output of 75 per cent. Under sacral anesthesia, fourteen grams of prostatic tissue were removed. There was no post-resection bleeding. Patient was discharged from the hospital three days later, voiding normally. He has been seen at frequent intervals since that time, has no residual and gets up but once at night.

Case No. 5: Mr. C. W. M., age 61, referred by Dr. G. A. Hopkins, entered the hospital February 22, 1932, complaining of frequent nocturnal urination with difficulty in starting the stream and a marked diminution in the force of the stream. There was ninety c.c. of residual urine. On rectal examination the left lobe was found to be markedly enlarged, symmetrical and showing no evidence of malignancy. The cystoscopic picture showed a marked intravesical protrusion of the left lateral lobe, producing definite obstruction. An indwelling catheter was inserted and decompression commenced. After one week the blood urea, creatinin, blood sugar, blood clotting time and hemoglobin were within normal limits; the phthalein output was 68 per cent. Under trans-sacral block, sixteen grams of prostatic tissue were resected with some bleeding at the time due to its marked vascularity. There was no post-operative bleeding and patient was discharged from the hospital three

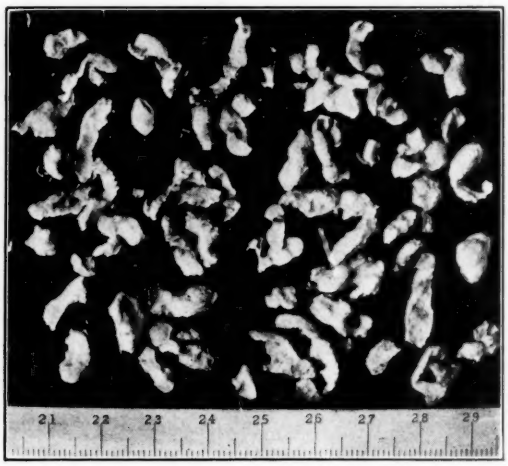

Fig. 6.—Prostatic tissue removed from second case herein reported. This weighed 18 grams. Note the length of pieces and their relative thickness.

days later, voiding normally, the residual urine being entirely relieved.

Case No. 6: Mr. R. F. M., age 83, seen on February 1, 1932, complaining of inability to void normally. Patient was somewhat uremic and confused mentally. Decompression was instituted and the blood retention and renal excretion tests became normal. On February

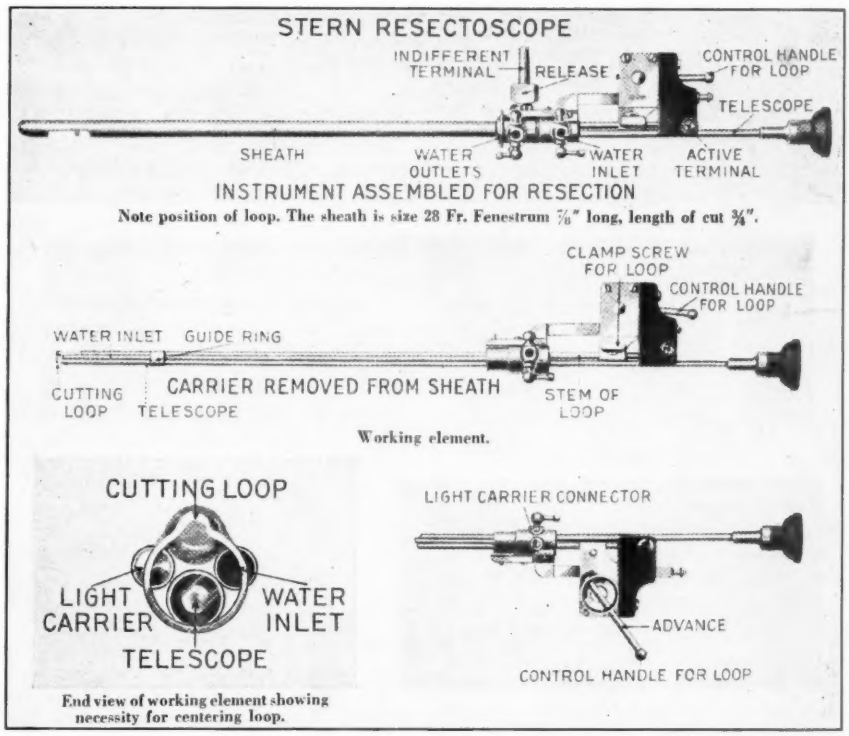

Fig. 7.

8, 1932, resection of the prostate was done. There was some bleeding during the resection which was controlled by repeated coagulation. Twelve grams of prostatic tissue were removed. An indwelling catheter was inserted and continuous drainage instituted. The patient left the hospital two weeks later, voiding normally, with no residual urine.

Lack of space precludes the report of any of the other sixteen cases.

Conclusions

1. In median bars, contracture and other forms of minor obstruction of the vesical outlet, transurethral resection is the method of choice.

2. In hyperplasia of the lateral or median lobes, the obstruction can be corrected in Grades I, II and III, but should not be used in Grade IV or the very vascular type of obstruction nor in very old, feeble subjects. In the presence of complications, such as diverticula or stone, resection may be followed by litholapaxy or excision of the diverticulum.

3. Hemorrhage can and *must be adequately controlled* by using the fulgurating or spark-gap current, thus eliminating the principal hazard connected with this procedure.

4. The mortality has been greatly lessened, the morbidity decreased and the average stay in the hospital reduced to days instead of weeks as formerly.

5. Transurethral prostatic resection is a highly technical procedure and meets all the requirements for this type of work.

6. By treating the patients earlier, cardio-vascular, renal and the systemic derangements following massive retention, will be greatly reduced or obviated.

7. Preliminary cystoscopy, orienting the type and character of the obstruction, is necessary.

8. Resection is a supplement to and not a substitute for prostatectomy, each having definite, clear-cut indications.

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THE PHYSICAL AND X-RAY EXAMINATIONS OF THE TUBERCULOUS CHEST.*

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and
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It is not the purpose of this paper to go into a detailed description of the physical and X-ray examinations of the chest in pulmonary tuberculosis. It is sufficient to say that those of you who make a routine practice of examining the chest with care do not need any advice or further information. But those of you who examine the chest more or less casually are not apt to get the information you should have from the examination, and from neglect of making a careful examination, you get so you do not hear abnormal changes when they are present.

The two chief reasons why many of us fail to elicit abnormal findings when present are, first, we do not make a very careful examination of the chest, carefully using all the means at our disposal, and, second, without this careful examination of the chest, we get so we do not recognize abnormal findings due to lack of familiarity with them.

In addition to the physical examination of the chest, it is necessary to have X-ray examination of the chest also, in order to get as complete information as possible, as will be shown from charts and X-ray films that illustrate the findings in some tuberculous chests.

The history and observation will not be considered or mentioned further in this paper, not on account of the lack of importance of these, but due to our efforts to show only the importance of having both physical and X-ray examinations of the chest and in the attempt to confine ourselves strictly to the subject of physical and X-ray examinations.

Case I.—D. W. A.—Moderately advanced.

Physical examination—Positive.

Right Lung:—Moist rales from apex to second rib. Also, increased whispered voice and prolonged expiration over the same area.

Left Lung:—Negative, except for slightly increased whispered voice in the apex. No rales.

X-ray examination—Positive.

Right Lung:—Infiltration in the apex and along first and second interspace trunks. Slight infiltration along third interspace trunks at periphery. Area in second interspace interpreted as a small cavity.

Left Lung:—Slight infiltration in apex and first interspace.

Sputum positive.

Physical and X-ray examinations gave practically the same information, with exception of cavity formation in right second interspace not made out from physical.

Case II.—C. E. R.

Physical examination practically negative.

X-ray examination practically negative.

Sputum positive at another laboratory before patient was admitted. Positive on admittance and three times at intervals while here. Usually no expectoration.

An exceptional positive sputum may be obtained where physical and X-ray examinations are not positive, probably from a caseating area somewhere along the bronchial tract.

Case III.—N. K. D.—Minimal.

Physical examination negative except for slightly increased whispered voice in first interspace, left front. No rales.

X-ray—positive.

Right Lung:—No definite parenchymatous lesion.

Left Lung:—Definite area of infiltration in first interspace, anterior markings, near the periphery.

Sputum—negative.

From the physical findings in this case none of us would make a diagnosis of tuberculosis, whereas the X-ray showed definite infiltration. We find this often true in minimal cases.

Case IV.—F. W. K.—Far advanced.

Physical—positive. Numerous moist rales, bronchial breathing and increased whispered

*Read at the sixty-second annual meeting of the Medical Society of Virginia, in Roanoke, October 6-8, 1931.

voice, over front and back, practically throughout both lungs.

X-ray examination—positive.

Right Lung:—Numerous areas of heavy mottling and infiltration throughout. Cavity formation opposite first and second interspaces, anterior markings. Apex shows probable cavity formation also.

Left Lung:—Marked breaking down of tissue, with cavity formation, from apex to third rib, anterior markings, together with less marked infiltration from third rib to base.

Sputum—positive.

Both physical examination and X-ray showed an advanced lesion.

Case V.—F. M. L.—Far advanced.

Physical examination—June 8, 1931—negative except for a few moist rales from the fourth to eighth thoracic spine on the right back.

Physical examination—July 10, 1931—one month later:

Right Lung:—Numerous moist rales from apex to fifth rib and fifth thoracic spine.

Increased whispered voice and prolonged expiration from apex to third rib and fifth thoracic spine.

Left Lung:—Scattered, fine rales from first to fifth ribs, and from apex to third thoracic spine.

X-ray examination—June 8, 1931:

Right Lung:—Infiltration extending practically throughout, rather dense from apex to fifth rib, anterior markings. Apex and first interspace have appearance of cavity formation.

Left Lung:—Infiltration of moderate density from apex to fifth rib, anterior markings.

Slight haziness below this in base.

This (Case V) and the case just preceding (Case IV) serve to illustrate the differences that may be encountered in physical examination of the chests of patients with far advanced tuberculosis. In Case IV a diagnosis from physical would be all too easy, and we find that the X-ray findings compare with it very closely. In Case V, at the time of first examination the physical findings consisted of nothing more than moist rales over a small area in the back, while the X-ray showed that the patient had far advanced tuberculosis. The physical examination a month later checked closely with these X-ray findings, and we might say that it is not unusual for the physical findings to be very slight at one examination and pronounced some time later without any marked change in the X-ray.

Case VI.—C. S. J.

Physical examination—January, 1930.

Right Lung:—Moist rales from apex to fourth rib and eighth thoracic spine. Increased whispered voice and bronchovesicular breathing over the same area.

Left Lung:—Slightly increased whispered voice in the apex and a few moist rales in the back in the region of the fifth thoracic spine.

Physical examination twenty-one months later showed practically the same findings.

X-ray examination—January, 1930.

Showed tuberculous infiltration confined chiefly to upper right, with areas interpreted as cavity formation.

X-ray examination twenty-one months later, at the same time last physical examination made, showed nothing more than a little hazy infiltration in apex and first interspace on the right.

This case serves to show that both physical examination and X-ray films are necessary to ascertain the course or progress of the disease from month to month and year to year.

The findings shown here can be demonstrated over and over again in patients undergoing treatment. As you can see from this, in spite of the importance of the physical examination of the chest, it is necessary, also, to have X-ray examination, repeated at intervals, in order to give us the proper conception and idea of the tuberculous involvement present and, also, the progress of the disease. In suspected pulmonary tuberculosis, it is dangerous to pass up the X-ray examination, after making a physical, as some of these cases will show findings from the X-ray examination on which a positive diagnosis can be made and which would probably be passed up as negative from the physical alone. Also, this is true in many minimal cases. To a less extent it is true in moderately advanced cases, and occasionally in far advanced cases.

In most cases, a study of the physical and X-ray examinations together gives the most complete information and enables us to visualize the lesion to the best advantage, while from the physical examination alone we could be misled as to the extent and seriousness of the disease. Cavity formation can often be made

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out from the X-ray examination when no physical signs of it can be found. The X-ray examination is usually of greater help than the physical in determining the progress of the lesion. An exceptional case may be found in which the sputum is repeatedly positive, while the physical and X-ray examinations are consistently negative.

To diagnose and treat pulmonary tuberculosis successfully, it is necessary that we have all the information that it is possible to obtain, and we cannot get this information without both physical and X-ray examinations of the chest.

NOTE.—This paper was illustrated by lantern slides.

DISCUSSION

DR. W. E. BROWN, *Sanatorium:* Dr. Nicholl's paper and illustrations have been repeatedly verified in my own experience. Every point that he has brought out to you we have had happen in our work at Blue Ridge Sanatorium. There has been nothing new found in recent years in the way of improving the methods of physical examination, but the technique of roentgenological examination of the chest has developed by leaps and bounds. I well remember, at the meeting of the National Tuberculosis Association, in Cincinnati, in 1917, when Dr. Kennon Dunham showed X-ray pictures of tuberculous chests, he was the most hard-grilled man by our leaders in tuberculosis work that I have ever seen. He, however, stood by his guns and after they had riddled him with all the ammunition they had he brought the lungs of the people whose X-rays he had been showing and cut them open for exhibition, and proved his contentions, taking the meeting by storm. Up to that time I had repeatedly heard men say, "The other fellow can have the X-ray but give me my stethoscope." I would not belittle the importance of physical examination but if you had a patient for me to examine and told me that I could take a stethoscope and examine him, or have proper X-ray stereo films of the chest, and could only use one of these two methods, I would take the films.

We all remember Dr. Lawrason Brown's five points on tuberculosis. They seem to be basically sound. They are: (1) The finding of tubercle bacilli in the sputum; (2) The presence of moist rales above the third rib in front or above the third thoracic spine in back; (3) Demonstration on X-ray films of a definite parenchymatous lesion above the second rib in front or above the body of the fourth dorsal vertebra in back; (4) History of pleurisy with effusion; (5) Hemoptysis. He said that we would never be justified in making a diagnosis of pulmonary tuberculosis unless one of these five points could be demonstrated.

THE VALUE OF THE ROENTGENOGRAM IN THE STUDY OF MASTOIDS.*

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The roentgen ray as a diagnostic aid in mastoid disease has been in general use for several years. During this period there has probably been less general improvement in the method than in some other fields of roentgen diagnosis. This seems rather strange when we consider there are no basic fundamental obstacles to the method.

The roentgen ray is a physical agent, capable of being controlled, and when properly controlled, it will record accurately variations in density of structures.

To obtain accuracy in diagnosis, a roentgen study of the mastoid should be made carefully and with proper attention to detail. This involves:

1. Films of the greatest possible technical quality.
2. The use of standard angles of exposure, which can be accurately reproduced.
3. The use of stereoscopic films when considered advisable.
4. A careful study and interpretation of the films so produced.
5. A knowledge of the pathological changes incident to mastoid disease.
6. Proper cooperation between the surgeon, or otologist, and the roentgenologist.

Little time need be taken to discuss the first requisite—good films. These can be produced in any laboratory if sufficient pains are taken to do so. The use of fine focus tubes, small diaphragms, immobilization of the patient, and proper attention to developing technique, will help to improve the quality of mastoid roentgenograms.

The proper reading of the film depends upon the clearness with which the fine lines of the cell walls are seen and the detailed visibility of the bony texture of the non-cellular region. If the film is too light, the relative contrast between the bone and cell cavities is lost; if too dense, the entire mastoid is fogged, even though the cells are occluded by pus.

The use of standard angles cannot be stressed too strongly. These angles should not be guessed at, but should be measured by whatever means the individual worker prefers. It is preferable to place both mastoids on the same film, in order to facilitate comparison, as in the majority of cases only one side is diseased. It is obvious that the films of the right and left mastoids must be similar, or comparison is difficult. For the same reason, films of the same mastoid made at different times must be similar or the value of the subsequent examinations will be lost. While stereoscopic films are per-

*Read before the Virginia Society of Otolaryngolgy and Ophthalmology, at Richmond, Va., May 2, 1931.

haps preferable, it is only in exceptional cases that they are essential, for instance, when an accurate determination of the position and depth of the sinus is desired, where there is doubt as to a suspicious shadow suggestive of bone destruction, where it is necessary to determine the presence of diploetic bone, or where an examination is required of an unhealed operative area.

In the interpretation of the roentgenogram we must bear in mind that we are dealing with shadows of varying density, and time must be taken to study them carefully for pathology. We must be able either to compare the special areas of one side with corresponding areas of the opposite side, or, if this is not possible, to compare the mastoid with our mental picture of what the normal appearance should be. Therefore, the roentgenogram of the two mastoids should be as nearly alike in density and contrast as it is possible to make them. Ordinarily, the surgeon needs only to know the type of mastoid, the degree of involvement of the cells and bony trabeculae, and the presence or absence of cavity formation, to pass judgment on the treatment of a case. However, it is essential to stress the fact that all roentgenographic examinations are only a part of a more complete general examination. The history, the clinical evidence and the pathological laboratory findings should be correlated with the roentgenographic findings in the final summing up of a case. Therefore, close cooperation is necessary between the surgeon and the roentgenologist.

There is considerable difference of opinion among surgeons regarding the modus operandi in mastoid disease. Some advise early operation and others take the more conservative view, and attempt to clear up a condition without operation, and it is here the roentgenogram may have considerable bearing on the final decision.

It is obvious that operations would be performed in many cases which are X-rayed even if no roentgenogram had been made. However, in cases where operation is clearly indicated by the clinical evidence, the knowledge of the regional anatomy and the pathological variation from the normal as indicated on the film is often of invaluable assistance to the surgeon.

Before proceeding further with the discussion of the interpretation of roentgenograms of the mastoid, we will briefly review the anatomical landmarks and development of the mastoid process.

The temporal bone contains certain landmarks which are employed as guides in operating and describing a pathological condition within the mastoid.

Generally speaking, the mastoid process may be identified under two distinct types, the non-cellular and the pneumatic, the essential difference existing in the cellular structure of the area between the posterior canal wall in front, the tegmen tympani above, the limiting border of the mastoid behind and the tip below. The relations of the canal, antrum and sinus are practically the same in both types.

The non-cellular type of mastoid may be further sub-divided into (1) undeveloped or infantile, (2) diploetic, and (3) sclerotic, and from a radiographic standpoint, very little distinction can be made between them. They all present a more or less dense homogeneous shadow, devoid of cellular detail. According to Law, the diploetic type of mastoid will show a fine meshwork of diploe, usually near the tip, and necessitates a technically perfect film to make detection possible. The infantile and diploetic types are the result of a developmental failure in cellularization. The sclerotic type, on the other hand, is due to a chronic inflammatory process which has caused the obliteration of previously existing cells, and replaced them with hard eburnated bone. This bone is much harder than the normal bone of an undeveloped mastoid. A roentgenogram of this type, combined with a history of chronic suppuration, is usually indicative of sclerosis. As stated above, however, the differentiation between these three types is usually difficult.

The pneumatic type of mastoid may consist of large, small or mixed cells, or there may be a combination of the cellular and non-cellular types. The size and cellular appearance of the normal mastoid varies a great deal in different individuals, yet it has been determined from specimens and roentgenograms that the two pneumatic mastoids are essentially symmetrical in the same individual, with very few exceptions. This is a very fortunate ruling of Nature, as a comparison of the two mastoids helps materially in the interpretation of the roentgenogram.

A pneumatic mastoid may be very small, or it may be quite extensive. According to Law,

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the average mastoid measures one and one-half inches from the tip to the tegmen and about one inch from the posterior canal wall to the center of the posterior border of the process. The cells frequently extend well forward into the zygomatic region, upward into the squamous portion of the temporal bone, and posteriorly into the occipital bone.

The mastoid antrum is located above and slightly posterior to the auditory meati. It cannot, as a rule, be identified as an individual cell being superimposed by smaller cells nearer the cortex. It is in this region that the first changes of an acute mastoiditis become evident.

Just behind the auditory canal is a dense area of non-cellular bone which is the posterior canal wall. This is an important landmark, for within this wall, is the facial nerve. Another most important anatomical landmark is the lateral sinus, which can often be seen throughout its longitudinal and sigmoid portions. Sometimes it shows very clearly and sometimes very faintly, or not at all. The reason for this is quite evident when the cellular structure surrounding the sinus is considered. In the normal pneumatic mastoid, the sinus groove is usually only faintly visualized, but in the pathological or undeveloped type the visibility is increased, due to the increased density of the surrounding area. The sinus may be situated anteriorly, posteriorly or in a median position, in relation to the posterior canal wall, which information is of considerable importance to the surgeon.

The mastoid emissary vein may occupy a position anywhere between the tip of the mastoid and the knee of the sinus. When seen on the roentgeogram, it should be reported to the surgeon, so as to avoid accidental injury and unnecessary bleeding during operation.

The foregoing pertains to the adult type of mastoid. Until recently, it has been the general opinion of roentgenologists, as well as otologists, that in children under three years of age a roentgenogram of the mastoid process would yield practically no information, because pneumatization had not taken place to any extent, except in very unusual cases. Recent roentgenologic studies and observations, however, with the employment of more perfected technique, have proven this opinion to be incorrect.

In a roentgenologic study of forty-six (46) children under five years of age, seven of whom were less than one year old, Evans concludes: "Pneumatic mastoid structure is frequently observed before the end of the first year of life. The adult mastoid structure can be observed as early as the second year."

Martin, in a recent article states: "After the age of six months, a cavity having the shape of the mastoid, can be demonstrated below the tegmen tympani and behind the external auditory meatus, in good roentgenograms. This cavity varies markedly in size and may measure three-fourths of an inch in diameter and show definite cell structure by nine months, though such excessive development is unusual.

Granger, in a recent study of a large number of infants, concludes that in radiographs of healthy mastoids of infants under one year of age, one sees only the large mastoid antrum, and in those from one to two years of age, besides the mastoid antrum, the clear osseous substance of the mastoid can be seen. After the second year, the mastoid begins to pneumatize, the cells are of the diploetic type, and the anterior wall of the lateral sinus, only slightly visible at first, becomes more distinct as pneumatization progresses.

From the foregoing radiographic and anatomic data, one must conclude that it is possible to diagnose radiographically, mastoid pathology in infants and children, provided satisfactory films are obtained. After having examined a considerable number of babies, in many of whom mastoid infection was only suspected, there is no longer any doubt in my mind as to the real value of the roentgen examination. Pus, or granulation tissue, will produce a demonstrable difference in the shadow on the affected side when compared with the normal side, though double infections make interpretation more difficult.

It is true that some cases are encountered where the development is so poor that little information can be obtained, but fortunately they are not common. At any rate, I believe, any infant of any age in whom mastoid infection is suspected, is entitled to an attempt at a satisfactory roentgenogram.

In the interpretation of a mastoid roentgenogram, the following are to be looked for:

1. Anatomic structure and development.
2. Variations in density.
3. Softening and absorption of bony walls and intercellular septa.
4. Appearance of tegmen and sinus groove.

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In a normal pneumatic mastoid, the cell walls stand out as definite dense shadows surrounding the clear transparent areas, or air spaces. Anything in the locality of the mastoid, either intra- or extra-mastoidal, which offers added resistance to the roentgen ray, will cause a change in the transparency of the cells of varying degrees. There may, or may not be, obliteration of the intercellular septa, depending upon the condition.

As stated before, increased density and clouding of the cells intensifies the line of the sinus groove and causes it to stand out more clearly, which may be the only sign of mild pathology. A slight haze or cloud over the region of the mastoid cells, with no change in the cell walls, is usually indicative of mild acute inflammation, which may be only a contiguous hyperemia, or edema, incident to acute otitis media. However, it becomes evident that such conditions as furunculosis or eczema of the external auditory canal and post-auricular adenitis or cellulitis, may produce the same degree of opacity and must be considered in making a differential diagnosis.

A more marked increase of density and clouding of the cells is indicative of exudate, or pus and granulation. The roentgenogram shows an increase of the clouding of the cells in direct proportion to the amount of pus present. These changes in density may involve the entire mastoid process, or may be found in localized areas within it. If the discharge of pus is free and the type of mastoid is favorable, resolution may occur and the purulent mastoiditis may gradually clear up without any definite change in the bony trabeculae. On the other hand, if the formation of pus is in excess of the drainage, the pus accumulates in the cells until pressure takes place. With the increased pressure of the encapsulated pus, something must give way. If the cortex is thin, the pus may break through at that point, or if it is sufficiently thick, the pressure exerted on the intercellular septa causes them to soften and break down, due to shutting off of the blood supply.

In a mastoid process that contains cells with moderately thick walls, the early destructive changes can be detected on a good roentgenogram by a thinning of the walls. When the process progresses to necrosis and destruction, the separate cells begin to break down and form one large cell or cavity, and if it continues far enough, most or all the septa are destroyed and we have a large abscess formation, or a coalescent mastoiditis.

According to Law, this breaking down process usually begins at the knee of the sinus, although occasionally at the tip. If the necrosis continues further, the sinus wall becomes uncovered and the sinus exposed, causing a perisinus abscess. The necrosis may also occur above the antrum and the tegmen, accompanied by erosion of the inner table and the exposure of the dura, with the formation of an epidural abscess. Therefore, in studying mastoid roentgenograms, the sinus wall and tegmen should be carefully inspected for any erosion or solution in continuity.

The roentgenogram, properly interpreted, may be of invaluable assistance to the surgeon in determining whether or not operation is indicated in a particular case. In determining this point, the anatomical structure of the mastoid as well as the structural changes must be taken in consideration. If the case is to be treated conservatively, free drainage is absolutely necessary. As the mastoid must drain through the antrum, the size of the cells in this region plays a very important role. Large cells naturally allow better drainage than small cells, which easily become blocked by pus or swelling and edema of the mucous membrane, thereby obstructing drainage. Therefore, a mastoid which contains large cells in the antral region is more apt to improve without operation than one with small cells. In this type of case, subsequent roentgenograms made at suitable intervals will indicate which way the case is developing. Needless to say, the clinical evidence should be given due consideration. Repeated attacks of otitic infections will produce definite osteitic changes within the mastoid process, ranging from thickening of the cell trabeculae to marked sclerosis and eburnation, depending upon the severity and chronicity of the infection.

These conditions can usually be definitely recognized in the roentgenogram and may involve part or all of the mastoid process.

Occasionally in cases of chronic otitis media, a condition known as cholesteatoma will result in destructive changes in the mastoid process, which radiographically resembles a cystic formation and contains gelatinous material mixed with debris with foul odor. It may vary in size from a small area to one including the

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entire mastoid and usually shows a definite limiting border of increased density due to the resulting osteitis. This condition should be differentiated from: (1) an abscess cavity, (2) a large pneumatic cell, and (3) a cyst, which as a rule is not difficult.

In post-operative cases very valuable information may be obtained from the roentgenogram, when the necessity arises for investigation, to determine the causes for persistent discharge and delayed healing. A roentgenogram of the case will reveal the entire operative field, and, if any cells were not removed, they can be readily located.

Stereoscopic films are preferred in this examination in order to better locate the position of the remaining cells, if any are found. In a complete operation, the roentgenogram shows the clear excavated area, devoid of cellular structure, with the sinus clearly visible and the border of the operated field well defined.

SUMMARY

1. The roentgenogram is a valuable diagnostic aid in the study of mastoid disease.

2. Accuracy in roentgen diagnosis is dependent upon careful and painstaking technique, careful and thorough study and interpretation of the roentgenogram, and proper cooperation between the otologist and roentgenologist.

3. A roentgenogram of the mastoid should reveal the following information:

(a) Anatomical data.

(b) Abnormal variations in density.

(c) Absence or presence of destructive changes.

(d) Absence or presence of productive or sclerotic changes.

(e) Whether or not a pathological process is progressive.

4. In infants and children the presence of pathological conditions of the mastoid can usually be detected in good roentgenograms.

5. Radiographic findings should be correlated with the history, the clinical evidence and the pathological laboratory findings in the final summing up of a case.

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TRICHINIASIS—FIVE CASES IN ONE FAMILY—WITH RESULTS OF SKIN TESTS.*

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Trichiniasis or trichinosis is not a common disease in the United States if available records are an indication of its incidence. It is probably much more prevalent than we believe and there is no doubt that many mild cases escape recognition. Even typical cases with severe manifestations may be readily confused with more familiar diseases.

A review of the literature for the past ten years reveals only one significant development. Bachmann,[1] working with guinea pigs and rabbits, developed an intradermal test and a precipitin test for the diagnosis of experimental trichiniasis. There have been several instances in which these tests have been positive in human beings.

The findings in five cases in one family with observations on the diagnostic problems which arose are presented, together with the results of skin tests performed with an extract of trichinae, according to the method of Bachmann.

The excellent articles of Blumer,[2] Aldridge,[3] Conner,[4] and Opie[5] should be consulted for details not included in the following very brief review of the more practical aspects of this infection.

Etiology: In man the disease comes from eating raw or partly cooked flesh from hogs infested with trichinae or trichinella spiralis,

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a small ovoviviparous nematode or round worm. The adult female, which is 3 to 4 mm. long, is about twice as large as the male.

A brief review of the life cycle of the trichina simplifies and anticipates the clinical and pathological features of the disease. The worm may exist in an inactive, encysted, nearly mature form in the skeletal muscle of any animal, more commonly in the rat and hog. When this muscle is eaten by another animal the cyst wall is digested by the gastric juice of the new host and the hitherto inactive larvae set free. They mature rapidly in the small intestine. The females, after copulation, burrow into the intestinal mucosa far enough to discharge living embryos into the lymph spaces, four to seven days after ingestion.[3]

These young embryos, about 1,000 from each fertilized female, then invade the intestinal wall. Some may appear in the peritoneal cavity, but the majority follow the lymph vessels to the blood stream by which, after passing through the lungs, they are promptly distributed throughout the body.

At this stage they exert a selective point of attack. They invade and enter individual skeletal muscle fibers, which soon degenerate. Other tissues are not specifically affected. In two or three weeks the embryos have grown almost to adult size and have coiled up in the cyst which promptly forms about them. There is no further development of the embryo, which remains quiescent until eaten by another animal. Then the life cycle is repeated.

Grey rats are believed to be very commonly infested and, being cannibals, tend to perpetuate the disease. Hogs are thought to become infested from garbage into which rats or uncooked pork have been thrown. Infected meat may be rendered safe by heating for a few minutes to 160 degrees F., or by cooling to 5 degrees C. for twenty days. Fecal contamination from infected animals or persons does not produce the disease because the parasite does not withstand gastric digestion unless it is encysted.

Clinical Features: The growth, fertilization and procreation of the trichinae in the intestine are frequently associated with gastrointestinal symptoms which are not at all distinctive. The characteristic symptoms appear during the second week when the embryos, carried by the blood, invade skeletal muscle fibers and produce widespread acute myositis. Typically the myositis is most marked in the deltoids, gastrocnemii, intercostals, diaphragm, tongue, and extrinsic eye muscles. As a result they become swollen, firm, tender, and painful on motion. Moving the arms, walking, breathing, chewing, talking, and use of the eyes cause pain. The swelling is usually more obvious around the eyes than elsewhere, but is also quite characteristically found in the feet and legs. The widespread myositis is accompanied by fever and leucocytosis. Indeed, the fever and toxemia may be typhoidal in character. Many bizarre manifestations may occur during this period of invasion by the embryos.[4] For example, instances of exophthalmos, encephalitis, myocarditis, tonsillitis, meningitis, polyserositis, otitis media, and selective involvement of only one muscle group have been recorded. It is interesting to note that the lungs seem to be irritated by the passage of many parasites, with the result that bronchitis, pneumonia, and asthma are frequently present. Opie[5] has demonstrated collections of eosinophiles in the lungs of trichinous guinea pigs.

Symptoms begin to subside when wholesale invasion of muscle fibers ceases, and disappear when all the embryos become encysted, three to ten weeks after eating the infested pork.

It is quite obvious that the severity and duration of the symptoms will vary directly with the number of embryos reaching the muscles and that many cases will be so mild as to escape detection.

The *diagnosis* is easy if the disease is suspected. The gastrointestinal symptoms are not distinctive and are usually thought to be due to dysentery, a dietary indiscretion, or summer diarrhea. The muscle pains and fever are frequently mistaken for grippe or mild influenza, or, when more severe, they may simulate acute arthritis, rheumatic fever, early poliomyelitis or early osteomyelitis. The edema of the eyes strongly suggests nephritic edema or disease of the paranasal sinuses. The bronchitis, asthma, and pneumonia are rarely attributed to trichiniasis, though they may be the most obvious manifestations of the disease. X-ray examination of the lungs may, with the physical signs, lead to an erroneous diagnosis of tuberculosis. Somnolent, toxic cases may be mistaken for typhoid or encephalitis.

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When trichiniasis is suspected early, the adult parasites may sometimes be found in the stools. During the period of invasion embryos may be found in the blood stream. They are readily demonstrated in the peripheral blood if about 5 c.c. are laked in 3 per cent acetic acid, centrifuged, and the sediment examined. After the muscles have been invaded, the embryos may be found with ease in a small bit of fresh, or fixed and stained muscle, preferably taken from the musculotendinous junction of the gastrocnemius. In stained preparations the accompanying myositis may be severe and, indeed, if the infestation is slight, may be the only evidence of the disease unless serial sections of several bits of tissue are examined. The cysts with the coiled parasites are readily recognized, the cysts staining pink and the embryos blue with hematoxylin and eosin.

Eosinophilia is typical. It usually appears in five to eight days. It varies from 6 to 60 per cent in individual cases and from day to day in the same case. The finding of 6 to 10 per cent eosinophiles in the blood smear should alone suggest the possibility of trichiniasis. Cases which are very mild or very severe or those complicated by pneumonia sometimes fail to show eosinophilia. The percentage of eosinophiles is not an index of the severity of the disease.

Bachmann,[1] realizing the importance of an early diagnosis, working with rabbits and guinea pigs, reported the presence of detectable precipitins as early as the twentieth day. He also developed a technique for skin testing, using an extract of powdered trichinae as the antigen, which gave positive results on the fifth day. His experiments seem to be sufficiently well controlled to establish the specificity of his results.

The *prognosis* varies directly with the intensity of the infestation. Available statistics show the death rate to be somewhat over 6 per cent. This figure is probably much too high and cannot be accepted as a reliable index of the prognosis. Many cases are unquestionably not diagnosed and are, therefore, not included in the statistics, which are based largely on the cases recorded in the registration area of the U. S. Department of Commerce. In fatal cases death is usually due to pneumonia or toxemia. The pneumonia may begin during the period of invasion when the trichinae are passing through the lungs or later, when the myositis in the intercostals and diaphragm promotes hypostasis by markedly reducing the respiratory excursion. With encystment there is usually a return of normal function. Sequellae are very rare though occasionally muscle pains persist for years.

No specific *treatment* has been found. Many remedies, including convalescent serum and irradiation, have been tried. Theoretically, anthelmintics and those cathartics which act upon the jejunum and ileum administered during the incubation period should decrease the number of invading trichinae. Unfortunately the diagnosis is rarely suspected this early. After invasion has begun, it is obvious that little benefit could be derived from these measures.

During the stage of invasion and before encystment has begun, intravenous anthelmintics seem logical. It is not unlikely that the favorable reports from the clinical use of arsphenamine[6] and tartar emetic,[7] and the experimental use of neutroflavine[8] are due to their use during this stage. One of us had one mild case a few years ago which responded to tartar emetic exactly as did the case reported by Grove.[7]

After the myositis and edema are well established, it does not seem logical to expect appreciable improvement from any form of specific therapy. Indeed, the treatment must be purely symptomatic and directed towards the relief of pain and the elimination of toxins.

The Outbreak: The mother of seven children, 11, 9, 8, 5, 2, and 1 year old twins, died in the hospital of pneumonia (a review of her record suggests that she had trichiniasis, but this was not proven). The father was physically and economically unable to provide adequate care for the children. The chief articles of diet were home cured ham and bread. Frequently the ham was not cooked at all. The hogs from which the hams were cut had been fed on garbage in which a number of dead rats had been found. The relevant features of each case follows:

Case I: Claude G., a boy, aged 5 years, was admitted to the University of Virginia Hospital on January 2, 1930, complaining of "asthma" and "fever."

The past history was unimportant except for asthma.

Physical examination showed a fairly well

nourished white boy obviously acutely ill and very irritable. The throat was slightly injected, breath sounds were wheezing in character, and musical and moist rales were heard. Expiration was somewhat prolonged. The liver edge was palpable 3 cm. below the ribs in the mid-clavicular line. Rectal temperature on admission was 102.6 degrees.

On January 7th, five days after admission, the child's condition was obviously more alarming. Rectal temperature was 103.6 degrees. He complained of slight pain when his arms were moved, the pain apparently being referred to the shoulder regions. An X-ray of the chest taken at this time was suggestive of tuberculosis. On January 12th there was marked tenderness of the thighs, particularly on the left side. The child lay with the extremities in a flexed position and bitterly resented any efforts to move him. The abdomen was distended and there was some generalized tenderness. Osteomyelitis of the left femur was suspected but an X-ray of this region was normal. The following day edema was noticed for the first time, appearing first in the ankles, then in the face, and, later, in the neck, hands, lower legs, and mastoid region. Examination of the ears at this time showed a red bulging drum on the left side. Myringotomy was performed and thick pus obtained. The following day respiration became difficult and chest examination showed diffuse pneumonia. At the same time an indurated swollen area appeared in the submental region and the patient had difficulty in opening his mouth. The patient rapidly lost ground, abdominal distention and edema increasing. Death occurred on January 24th, twenty-two days after admission.

Examination of the urine was negative. Specimens of blood at the height of the illness failed to agglutinate bacillus abortus, bacillus typhosis, or bacillus tularense.

Blood examinations at the time of admission were as follows: Hemoglobin 65 per cent, red blood cells 4,250,000, white blood cells 15,000, p.m.n.s 85 per cent, lymph 14 per cent, l.m.n.s 1 per cent. Stool examination showed ova of ascaris lumbricoides. Wassermann and intradermal tuberculin tests were negative. Twelve days after admission the blood findings were: P.m.n.s 63 per cent, lymph's. 15 per cent, l.m.n.s 3 per cent, eosin. 19 per cent, a few macrocytes, slight anisocytosis and diffuse polychromatophilia.

A sample of blood examined January 18th showed the presence of trichina embryos. Blood cultures were sterile.

Biopsy from the gastrocnemius muscle on January 20th showed the muscle heavily infested with trichinae.

The positive autopsy findings were edema of the feet and ankles, fatty liver and kidneys, and congestion of the transverse colon. Numerous sections of the lung failed to show the presence of trichinae or collections of eosinophiles.

Case II: Robert G., an 11 year old boy, was admitted to the hospital for tonsillectomy, and for observation because of trichiniasis infection in a brother. For two weeks previous to admission the boy had seemed drowsy and listless. There had been no muscle tenderness, no edema, and no gastrointestinal symptoms. At no time during his stay in the hospital did he show symptoms of infection with trichinae, other than a slight temperature.

Urinalysis and blood Wassermann were negative. Examination of the blood showed hemoglobin 95 per cent, red blood cells 4,420,000, white blood cells 10,600, p.m.n.s 74 per cent, lymph's. 14 per cent, l.m n.s 4 per cent, eosin. 12 per cent. Other blood examinations showed an eosinophilia as high as 41 per cent. Two c.c. of peripheral blood showed no trichinae. A biopsy from the gastrocnemius muscle showed no embryos, but a very definite myositis.

Case III: Frances G., a 9 year old girl was admitted to the hospital for observation on account of trichiniasis in another member of her family.

Past history was unimportant.

The admission examination showed the child well nourished and somewhat irritable. The rectal temperature on admission was 101.2 degrees F. The face was flushed and slight edema of the lids was evident. The pharynx and tonsils were slightly inflamed and the cervical, axillary and inguinal glands were palpable. Rales were heard throughout both lungs. They disappeared after three days. There was no edema of the extremities and muscle tenderness was not elicited. Two days after admission the edema of the lids had increased and there was slight edema of the ankles. By the following day edema had in-

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creased and was pitting in character over the tibiae. There were no gastrointestinal symptoms. All symptoms and signs were absent at the time of discharge from the hospital.

The urinalysis on admission was negative. Blood Wassermann was negative. The stool showed ova of ascaris lumbricoides, trichiuris, and cysts of ameba coli, but no trichinae. Blood examination was as follows: White blood cells 4,600, p.m.n.s 65 per cent, lymph's. 27 per cent, eosin. 8 per cent. Subsequent blood examinations showed an increasing eosinophilia, the maximum percentage being 28 per cent. No trichinae were found in the peripheral blood. A biopsy from the gastrocnemius muscle showed no trichinae in the muscle, although a very definite myositis was present.

Case IV: Fannie G., a white girl, 8 years of age, was admitted to the hospital on January 20, 1930, complaining of pain in the arms and legs and difficulty in walking on account of pain, these symptoms being first noticed four days before admission. Constipation had been present for several days.

The following physical findings were noted: The throat was slightly inflamed. The muscles of the extremities appeared tender, and passive motion of the arms and legs caused pain. There was slight edema of the extremities, while edema of the eyelids was distinct. The abdomen appeared distended. Edema and muscle tenderness and irritability became more marked as the illness progressed. Twelve days after admission the child developed a croupy cough. Respiration became rapid and examination of the chest showed the presence of bronchopneumonia. An X-ray of the chest taken on the following day verified this diagnosis. Chest signs persisted for ten days, during which period the child appeared very ill. Recovery was complete and the patient was discharged from the hospital on February 20, 1930, one month after admission.

Laboratory Examinations: Urinalysis was negative. Stool showed ova of ascaris lumbricoides. Wassermann was strongly positive. Subsequent blood examinations showed an eosinophilia as high as 12 per cent, white blood cells 8,300, p m.n.s 70 per cent, lymph's 21 per cent, eosin. 9 per cent. Larvae of trichinella spiralis were found in 3 c.c. of peripheral blood, and a biopsy from the gastrocnemius muscle showed the coiled forms of the parasite. Subsequent blood examinations showed an eosinophilia as high as 31 per cent.

Case V: Ola Mae G., a 2 year old infant, was admitted for observation on account of a proven case of trichiniasis in her family. For three weeks previous to admission the child had suffered from diarrhea, with four or five watery yellowish stools a day. The presence of muscle tenderness previous to admission could not be determined.

Physical examination showed a well developed child. Rectal temperature was 99.4 degrees F. The face and eyelids appeared puffy. There was slight pitting edema over the tibiae. The child was irritable and cried when handled, as if in pain. Two days after admission edema of the lids had increased.

Urinalysis was negative. The blood Wassermann was doubtful. Examination of the blood showed hemoglobin 75 per cent, red blood cells 3,970,000, white blood cells 9,100, p.m.n.s 39 per cent, lymph's. 38 per cent, l.m.n.s 4 per cent, trans. 5 per cent, eosin. 14 per cent. Subsequent blood examinations showed no further increase in eosinophiles. No trichinae were demonstrated in 2 c.c. of peripheral blood. A biopsy from the gastrocnemius muscle showed numerous coiled embryos. Recovery was uneventful.

The incidence in these cases of the more common manifestations of trichiniasis with observations on the effect of treatment, etc., is summarized in Table I.

It will be noted that irritability occurred four times and drowsiness once, muscle pains three times, edema four times, diarrhea once, constipation once, pneumonia or bronchitis three times, fever five times, leucocytosis five times, eosinophilia five times, other parasites in stools four times, trichinae in blood three times, trichinae in muscle three times, with marked myositis in the other two. One died. Another was critically ill. Two had mild but typical symptoms which might easily have been overlooked. The other had no subjective symptoms whatever but had typical laboratory findings. It is obvious that the last case would never have been suspected had he not been a member of this family.

Tartar emetic was tried in four of the cases, in doses recommended by Grove,[7] without apparent benefit. Improvement in the fourth case was coincident with the administration of neoarsphenamine, after a thorough trial of tar-

TABLE I

CASE	CLAUDE	ROBERT	FRANCES	FANNIE	OLA MAE	TOTAL
Admitted:	1/2/30	1/22/30	1/22/30	1/22/30	1/22/30	
Irritable	+	Drowsy 0	+	+	+	4
Muscular pain and tenderness	+	0	0	+	+	3
Edema	+	0	+	+	+	4
Diarrhea	0	0	0	0	+	1
Constipation	0	0	0	+	0	1
Pneumonia	+	0	0	+	0	2
Bronchitis	+	0	+	+	0	3
Fever	100–104	99–101	99.5–103	100–102	99.5–101.2	5
LABORATORY FINDINGS:						
Leucocytosis	12–15000	10–13000	5–1000	7–12000	9–13000	4
Eosinophilia	0–19%	12–41%	8–28%	9–31%	11–21%	5
Parasites in stools	Ascaris	0	Ascaris trichiuris ameba	Ascaris	Ascaris	4
Trichinae in blood	+	0	+	+	0	3
Biopsy	+	Myositis	Myositis	+	+	5
Skin test	None done	++++	++++	++++	++	4
Treatment: tartar emetic	N. G.	0	N. G.	N. G. Neoarsph	N. G.	N. G.
Severity	Died	Mild	Moderate	Severe	Moderate	

tar emetic. The neoarsphenamine was not administered, however, until the child had been ill more than two weeks, when spontaneous recovery might be expected.

The first case was suspected of having poliomyelitis and osteomyelitis before the facial edema and eosinophilia appeared. An X-ray film of his chest had the appearance of active tuberculosis. He also developed otitis media and tenderness over his mastoid.

It is interesting that no trichinae or collections of eosinophiles were found in the lungs at autopsy.

One of the hams was obtained and was found to contain one to four trichinae per low power microscopic field. Using the technique of Bachmann,[1] the trichinae were separated from portions of ground ham by digestion with artificial gastric juice, followed by repeated washings with water. The trichinae were then dried and powdered and extracted (1:100) with Coca's solution. This extract was injected intradermally into four living children and examined after twenty minutes, one hour, five hours, and twenty-four hours. The extracting fluid was used as a control in the children. Two adults were injected with the extract and the extracting fluid as additional controls. The results of the tests are summarized in Table II. The appearance of the reaction was very similar to that of a positive tuberculin reaction. It will be noted that in three of the cases the test was strongly positive in at least one of the readings, but only moderately positive in the fourth case, and then at two and one-half hours. With the exception of the controls just mentioned, no effort was made to determine the specificity of the skin reactions.

XUM

TABLE II

Time after injection	ROBERT		FRANCES		FANNIE		OLA MAE		CONTROL 1		CONTROL 2	
	test	control	test	control	test	control	test	control	test	control	test	control
20 min.	++++	0	++++	0	++	0	0	0	±	0	0	0
1 hr.	++	0	+++	0	+	0	0	0	0	0	0	0
2½ hrs.*	.....	.....	.....	.....	.....	.....	++	0	.....	.....	.....	.....
5 hrs.	+++	0	++	0	++	0	+	0	0	0	0	0
24 hrs.	0	0	++	0	++++	0	0	0	0	0	0	0

*Not recorded except in case of Ola Mae.

The precipitin test of Bachmann was also performed, using the same antigen (as in the intradermal test) overlaid on the sera of the same four children. The results of these tests were not conclusive because of some precipitation in the controls. Further tests were prevented by the small quantity of available antigen.

SUMMARY

1. The more important clinical and pathological features of trichiniasis are reviewed briefly.

2. Five cases of trichiniasis occurring in one family are presented.

3. The source of the outbreak was an uncooked ham which was found to have one to four trichinae per low power field.

4. Intradermal tests, after the manner of Bachmann, with an extract of dried trichinae digested from the ham, were positive in the four surviving cases.

5. Should its specificity be proven for humans, further use of the skin test might eventuate in sufficiently early diagnoses to make catharsis and oral and intravenous anthelmintics efficient remedies for this disease.

6. Trichiniasis is probably far more common than is commonly believed. Certainly one and probably three of the milder cases would not have been diagnosed had not the other two been severe and typical.

7. It should be emphasized that trichiniasis may be readily confused with dysentery, bronchitis, acute asthma, pneumonia, early poliomyelitis, acute pulmonary tuberculosis, early osteomyelitis, early rheumatic fever, nephritis, meningitis, typhoid fever, and polyserositis.

8. Treatment with tartar emetic, after the manner of Grove, was definitely not helpful.

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REPORT OF NINE HUNDRED CONSECUTIVE ABDOMINAL OPERATIONS.*

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Some time ago the writer published the records of his first few hundred cases of abdominal surgery. He then had in mind the continuance of this course from time to time for the information of his friends, for any statistical value such a course might have in giving a cross section of the type of surgery met with in small general hospitals, as well as for the information of those who wish to know the kind of work a community is receiving, whether it be good or ill.

In casting about for a fitting subject of a paper to be read before this society, the writer

*Read by title at the sixty-second annual meeting of the Medical Society of Virginia, in Roanoke, October 6-8, 1931.

felt that he could do no better than submit an amplification of these reports. He wished to present something different from his average medical paper, to get away as far as possible from the banalities of limited case reports, featuring only items of favorable import, which rarely reveal anything of direct value concerning a surgeon's average work or worth.

With the exception of a number of herniaplasties done in a munition plant hospital during the war days, the records of which are not available, but in which there was no mortality, this paper contains the complete record of all the abdominal surgery ever done by the writer up to July 15, 1931. The omission of the above mentioned unrecorded work increased slightly the writer's mortality rate, but for better or for worse this paper is a surgical confession and as such is probably unique in the history of this society.

Operations noted here are consecutive. They were taken as they came, prepared for operation as best they might be, and none were refused operation when such a course seemed indicated.

Listed below are infants and those who had passed the allotted span of human life, many others who were in desperate straits from toxemia and infection, while not a few were the victims of traumatisms, all of which carry such well known operative hazards, that it is futile here to enumerate them.

These operations were done in the Petersburg, Hopewell, and Central State Hospitals, and are there recorded.

Listed below will be found:

Cases		*Deaths*	*Per cent*
158	Acute appendicitis — catarrhal, Suppurative, gangrenous	0	0
34	Appendiceal abscess	2	5.88
32	Diffuse peritonitis of appendiceal origin	6	18 75
58	Chronic appendicitis	1	1.7
	Total of 224 cases of acute appendicitis, appendiceal abscess, and peritonitis.		
	Total mortality of these three groups		3.61
	Total of 282 abdominal diseases arising from the appendix.		
	Percentage of total mortality arising from the appendix		3.33
164	Gonorrhoeal salpingitis with all pathology arising therefrom	3	1.8
8	Cholecystostomy	0	0
7	Cholecystectomy	2	28.6
7	Ovarian sclerosis	0	0
74	Hernias of various kinds	2	2.74
6	Mechanical obstruction of intestine	3	50.
4	Intussusception	1	25.
3	Perforating duodenal ulcer	1	33.33
10	Retroflexed uterus	0	0
1	Rupture of the liver	0	0
1	Rupture of the sigmoid	0	0
10	T. B. peritonitis	0	0
1	Gastrostomy	0	0
13	Caesarean sections	1	7.7
1	Endothelioma of ovaries in 7-year-old child	0	0
6	Exploratory, mostly for traumatism	0	0
62	Hysterectomies for fibroids	2	3.22
1	Toxaemias of pregnancy (freeing of adhesions)	0	0
24	Ovarian cysts	0	0
15	Ectopic pregnancies (13 ruptured, 2 unruptured)	0	0
7	Gunshot wounds of abdomen	4	57.14
2	Gunshot wounds of abdomen and thorax combined	2	100
1	Stab wound of stomach	1	100
1	Gastric ulcer	0	0
1	Acute pancreatitis	0	0
188	Sterilization of feebleminded with removal of appendix in practically all cases, as well as any other existing pelvic pathology	0	0
	Total of 900 cases operated on.		
	Total operative deaths		31.
	Percentage of total mortality		3.44

The urge to explain some of these deaths is well nigh irresistible, but such a course would perhaps be tiresome, certainly time-consuming, so the writer will content himself by stating that more than one-third of this mortality is represented by those who had passed threescore years and ten and by abdominal traumatisms. It should not be forgotten that many patients die in spite of operation and not as a result of such a procedure. It is manifestly unjust, in cases of ruptured intestines and in strangulated bowels, particularly in the aged, all of which are uniformly fatal without operation, to assess a surgeon with a high mortality rate when he operates and saves from 40 to 60 per cent of these patients. But such is our present method of classification.

After all, what do statistics such as these mean? They mean absolutely nothing of note to the writer or any one else, unless they measure up with the best the country affords. Warbasse states that the mortality from diseases of the appendix of all forms in the hands of experienced operators, range from 2 to 7 per cent. Some surgeons have 100 cases representing all kinds without a death.

In his tenth edition of Surgery, just off the press, Da Costa reports 100 cases of grave acute appendicitis operated on by himself,

Keen, and Hearn, with eight deaths—8 per cent cent mortality.

He cites Burgess' 500 consecutive operations with forty deaths—8 per cent mortality. In this series of 500 cases, when infection was limited to the appendix, the mortality was .75 per cent (135 cases); when there was circumscribed abscess, it was 4.64 per cent (213 cases); when there was diffuse spreading peritonitis, it was 19.07 per cent.

By the anoci method, Crile has been able to reduce his deaths to only two in 391 cases of acute appendicitis, with and without peritonitis, with the addition of narcotization in the very severe cases. This is .51 of 1 per cent, and is the best report on combined diseases of the appendix the writer can find; but unfortunately it is not specific.

Deaver reports 566 cases with an aggregate mortality of 5 per cent. In abscess about a necrotic and perforated appendix it was 12 per cent. In cases of diffuse peritonitis, the mortality rate was 31 per cent.

Coffey in 1906 collected 13,445 reports of operations for acute appendicitis with a mortality of 7.4 per cent.

According to H. C. Lowe, the death rate from appendicitis in the United States is over 10 per cent and is increasing. These reports might be multiplied indefinitely but their tenor is all the same.

The writer selected appendicitis with its associated pathology for comment because it is always with us, in all of its portentious manifestations; and because it is always the largest factor in any general surgical record; and because a knowledge of the peritoneum and the handling of peritonitis is perhaps the best known gauge of a man's ability as an abdominal surgeon.

The postoperative treatment of these cases has been the simplest possible. As a rule nothing is prescribed except fluids and rest, rest being assured by ample morphinization for the first few days. The maxim for postoperative cases should be: "Give them fluids and let them alone." This cannot be emphasized too strongly.

Fluids are given by the rectum, under the skin, and by mouth, when tolerated. Only cases of severe shock or marked dehydration are given fluids intravenously. Any intravenous solution is liable at times to produce a severe reaction, or create trouble in some other form, regardless of care in preparation or administration. Furthermore, "Water given intravenously is rapidly eliminated from the body Water absorbed through membranes or tissues is retained in much larger amounts. Water, to be most useful, should have a biologic pass."

Unless a patient is practically moribund on admission, or is rendered so on the operating table, the above simple treatment is usually ample. When either of the above conditions are encountered, emergency measures are of course imperative.

Heroic postoperative treatment is generally an apology for poor surgery. This should be guarded against as far as possible by a careful preoperative appraisal of the patient's resources and by proper preoperative treatment, followed by operative measures designed therefrom to safeguard the patient's vitality. It is here in these desperate cases that good judgment, speed, skill, and precision on part of the surgeon are often the patient's only chance of life. Under any circumstances, prolonged anaesthetics and operations are deplorable. It has been proven by phenolphthalein excretion that kidney function is often impaired in direct proportion to length of etherization and operation, even to the point of complete suppression. Other vital centers suffer in unison, and the toxic and debilitated patients too often fail to make the grade.

Appendiceal and other abscess cases have been opened and drained. Never has the writer dug an appendix from an abscess wall. If the appendix is free, or accessible without undue traumatism, it should be removed; but adhesions should not be broken down and infection spread in order to secure an organ that is no longer the principal pathology. It is here removed solely to prevent future trouble.

In case of ruptured appendix with diffuse peritonitis, unless the condition of the patient prohibits, this organ should be removed. If the peritonitis is far advanced and the patient's condition desperate, merely drain, or else follow Oschner's advice and treatment for these cases and do not operate until localization of infection takes place. All cases of diffuse peritonitis, in addition to removing or closing the focus of infection, when deemed advisable, have been treated by incision, limited drainage, Fowler's position, Murphy's drip, and morphine.

No drugs or enemas of any kind are used to secure bowel action.

Food by mouth is prohibited until peristalsis is re-established. Water by mouth is allowed when tolerated.

In most cases this is surprisingly early and entirely harmless.

It is trite to remark that anyone doing abdominal surgery has grave responsibilities to shoulder. Perhaps the greatest task of all is deciding what is to be done with a doubtful case. Here the Golden Rule is the only rule to follow. Such a course does not amplify an operative record, nor does it gather in the shekels; but it does maintain the integrity of the profession and the surgeon's self-respect.

The surgical attitude toward disease, of attack, attack, attack, encountered at times, is, to phrase it mildly, merely a form of operative mania. Surgical problems are not so simple that they can be solved by any one course of action. Surgical procedure grades from watchful waiting through palliative measures, on to operation for radical cure. No one of these is of sufficient importance in itself to be called surgery. It is just as important at times not to operate as it is at other times to operate. For instance, it is highly radical to operate on a case of postpartum infection, and equally radical not to operate on a case of suspected ruptured intestine.

Being human and subject to all the limitations such a statement connotes, the writer disclaims any idea of preaching, in calling attention to the perfectly obvious and often stated fact that there are entirely too many ill-timed, radical, and destructive operations being done, which often leave the patient dead, crippled or otherwise jeopardized for the rest of his life, and which require the minimum of skill or knowledge to perform. Particularly is this true where extensive surgery is done in the face of acute infection. Such work is unsurgical, is done every day, leads inevitably to a high mortality, and cannot be too repeatedly or too severely condemned.

It is futile for the average man, or any man for that matter, to expect to do good surgery without a certain degree of respect for the precept and example of our outstanding leaders in this specialty, and without a thorough grounding in the basic medical sciences, fortified by a comprehensive knowledge of surgical principles, all based on a character rigid enough to back his own judgment. After all is said and done, good surgery depends almost entirely on good judgment. This is developed, never created, by intense study, keen observation and experience.

In closing, a quotation from a recent article by Cushing seems appropriate. "Surgical judgment, indeed, is more or less an inspirational quality which is variable and elusive, all surgeons being conscious of having it in hand on some occasions, of losing it on others.

"It is a good deal like a game which even the best and most consistent player foozles for some unaccountable reason at certain times. It may be likened without being trivial to a form of major sport, which is played against an invisible but utterly relentless antagonist, quick to take advantage of every misplay and faulty move, and when the time comes to make public one's score, it is done somewhat apologetically, but with the expectation that others may profit by it, and with the assurance they will come to improve upon it."

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DISCIPLINE IN TUBERCULOSIS.*

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It is generally known that the three cardinal principles in the treatment of tuberculosis are rest, food and fresh air. It is also apparent that few among those outside the medical profession and, I am sorry to say, not such a great number in the profession, appreciate the relative value of the three. If rest were popularized as the cardinal principle, I am sure better results would be obtained toward the eradication of the disease. The application of the factors involved, however, rather than the factors *per se*, is the purpose of this paper.

We know that intelligent advice to the patient and the patient's family constitute the greatest service of the physician in handling a case of tuberculosis. Drugs are palliative only. Surgery is of great value in selected cases, but

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is applicable to relatively few, and then must always be followed by the same management as in non-surgical cases. The burden of obtaining a cure of tuberculosis is distinctly upon the patient, and in order that his efforts be directed in the proper channels he must receive explicit instructions from his doctor.

It is generally conceded that sanatorium treatment offers the easiest and most satisfactory method of getting the proper start toward securing an arrest or cure of tuberculosis. But all patients cannot have the advantages afforded by a sanatorium, and many must attempt the cure at home. So, whether in the sanatorium or at home, the question is the same. How must the tuberculous patient be instructed and what are the methods of discipline conducive to the best results?

The road to recovery is hard, long and tortuous and it is almost beyond the powers of the most stalwart, either within or outside of a sanatorium, to adhere rigidly and at all times to the course outlined for him. It is, therefore, necessary that the form of discipline employed by his doctor be effectively applied. For the doctor must be the disciplinarian.

It has been my privilege to have been intimately associated with all of the Virginia State Sanatoria and several outside the State, notably among the latter being Trudeau Sanatorium at Saranac Lake. This association has enabled me to fairly accurately evaluate the varying methods employed. The methods in each differ in certain particulars, but there are only two radical differences in approach to the problem.

These differences depend to some extent upon the number and type of patient in the institution and the attitude of mind of the management. In municipal sanatoria, especially when the number of patients is large and made up from individuals in all walks of life, it is often—usually, I might say—a matter of "obey the rules or get out." The attitude is assumed that the rules are made for the benefit of the patients, as are the specific general orders for each individual, and the patient who is so little interested in his own welfare as to disregard the rules does not deserve the time and patience of the management. He should make way for a more conscientious sufferer.

The other viewpoint, and the one more often assumed by private institutions, is this: The rules are made for the benefit of each patient. Each patient pays for the advice he gets. If he does not wish to get his money's worth or to get the maximum results by following the rules, then no one is hurt but himself. There is, of course, much to be said for both methods and, as is usually the case, the ideal solution is neither the one nor the other, but somewhere between the two.

Rules mean nothing to the average patient unless he knows it is to his advantage to obey them, and therein lies the secret of effective discipline. The reason for most breaches of discipline is the patient is either thoughtless or he is not fully convinced that the rules are beneficial, but like the small boy he adopts the attitude that rules are framed but to plague him and to restrict his liberty.

The group psychology of the average patient body is very similar to that of a group of school children. To them "playing hookey" is a lot of fun and does no harm unless they are caught. The thought, then, to instill into the mind of each patient, is this: When he breaks a rule he is not getting away with anything. He is only lessening his chances of recovery. On one occasion a patient, quite disgruntled, approached me in this manner: "Doctor, I feel fine and am tired of staying in bed all night and all day long. I want some exercise." I replied, "All right, take all you want. It will not bother me or anyone else." In great surprise he said, "But is it all right?" I replied, "Sure, it's perfectly all right. It simply means that you will not get well as quickly, and possibly not all. But I would also advise you not to stay here. It's quite all right with us if you do, but it seems foolish to pay for advice that you don't take." The man's whole outlook changed. He did not take exercise until it was advised and was in other respects a model patient, whereas, until that time he was chronically dissatisfied. I have also spoken to many other patients in a similar way and with equally good results. It is, of course, preferable to give the patient the proper instructions and the reason at length for them at the time he starts the "cure," but failing in this the above procedure is quite effective.

I do not wish to convey the idea that there should be no inviolable rules. Every institution must have certain regulations, breach of which should incur speedy dismissal. But such rules should be very few and limited to

gross misconduct or behavior that harms others or lowers the morale of the institution. Every sanatorium has on occasion the misfortune to admit a constant trouble-maker. Such a one can and often does destroy the morale of a large group of patients, and when his trouble-making tendency is discovered he should be dismissed as promptly as possible.

In state sanatorium practice I have heard several different patients express their reason for going to a state institution rather than a private one in somewhat these words, "I came here rather than to a private place because here they make you toe the mark. In those expensive places you pay a lot of money and do what you please. That's no way to get well." At that time I did not fully appreciate the injustice and absurdity of such an indictment. In this connection, I need only say that as a general rule in all sanatoria, State, municipal and private, it is the patient who is having his charges paid by someone other than himself who gives most trouble.

If patients can be convinced that the chances of a cure are in direct proportion to the rigidness with which the prescribed routine is adhered to, the job is made much easier for all concerned. It will not do to assume that the patient knows this fact.

I have in mind a certain pavilion at one of our Virginia Sanatoria. This building has two wards separated by intervening rooms. The patients on one ward took pride in adhering strictly to the rules and following the doctors' orders implicitly. A patient who fell short in any particular was immediately "jacked up" by the others. A certain spirit prevailed which made that ward the pride of the sanatorium. The other ward, though under the same roof, was entirely different and the patients there were constantly causing trouble. It required the observation of but a few months to note the vast difference in results. Many expedients were attempted to bring the morale of the "bad end" up to the standard of the other one. Patients were shuffled from one ward to the other. The worse offenders were dismissed. But the "good end" remained good and the "bad end" bad. An intangible something that can only approximately be defined as "spirit" kept the situation unchanged. Had both groups got off on the right foot as did the one, the difficulty might have been obviated.

It is my opinion that we sanatorium men as well as practitioners take too much for granted in dealing with the tuberculosis patient. When a man goes on the cure everything is new to him. He can only learn from the doctor and his fellow patients, and he is more likely than not to follow the example of the latter. Thus, each patient should be initiated into sanatorium routine by receiving a heart to heart talk by the physician in charge. The doctor should explain the reason and necessity for the regulations governing the sanatorium as a whole, and the specific orders that will be given to the patient himself. The whys and wherefores should be carefully gone over, the detail of the talk necessarily depending on the type and intelligence of the particular patient. In addition to the initial talk, subsequent informal discussion and talks both between the doctor and the individual and from the doctor to a group of patients should be the rule.

Although specific knowledge of tuberculosis may be harmful in certain instances, it is my firm belief that a general knowledge of the reasons for the rules governing a patient on the cure, by the patient himself, is conducive to far better discipline than may be had otherwise. It is hardly reasonable to expect a patient of ordinary intelligence to blindly follow instructions that have no meaning to him. On the contrary, well instructed patients who have yielded themselves unreserveredly to rules, the advisability of which they understand and approve, will, when they return home improved, so order their lives that the period of home cure will be appreciably shortened.

So much for sanatorium discipline. What about home discipline for the tuberculous patient? Of this little need be said. If discipline in the application of the thoroughly tried principles of treatment obtains results at well conducted sanatoria, superior to ordinary home cure, then discipline in the home should by all means be applied to such cases as cannot be hospitalized. This puts it squarely up to the doctor. Upon him rests the burden of making the patient and those responsible for his cure see that "the law (of cure) be taught and the reason thereof" and hold them rigidly to it by the method which many an old family doctor has long had at his command. If the patient has confidence in the doctor and the pa-

tient's attendants have the average amount of gray matter, the same sort of heart to heart talk outlined above will produce results, and the reading of the "riot act" when necessary by the doctor will prove as effective as it ever did.

It will be understood, I hope, why I have not specifically defined what the rules for taking care of a tuberculosis case are. These, of course, vary with the type and amount of disease present in the individual and with other factors pertaining to institutional or home management. In as specific a way as possible they have been ably set forth by others. I do wish to emphasize the necessity of getting the will of the patient behind the rules necessary.

The issues of life and death hang in a thorough understanding and application of discipline in the care of tuberculous patients. If I have helped in any way toward a better understanding of its import, the reading of this paper will not have been in vain.

OBSTETRICAL ANESTHESIA IN COUNTRY PRACTICE.*

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My subject today is one which I think is of interest to all physicians doing country obstetrics.

The city physician with hospital facilities is not considered in this paper, as he has assistants and apparatus at his call to use any number of anesthestics in his obstetrical cases.

Our greatest desire when called to an obstetrical case is to accomplish or assist the delivery with the least amount of suffering to the mother and no harmful results to the baby.

There is at present no anesthetic which will give us a painless child birth, and probably never will we find one; however, in considering an anesthetic we must consider several important points, as follows:

1. The mother's safety during and after the anesthetic.
2. The baby's safety during labor and after birth.
3. The place and condition where we use the anesthetic.
4. Will it relax the perineum and prevent deep lacerations.
5. Will it prolong labor.
6. Can we control it at all times.
7. Will the cost be small.

*Read before the Southside Virginia Medical Association, Petersburg, Va., December 8, 1931.

Could we find an anesthetic which would fulfil all these it would be 100 per cent, but we cannot, so must try to come as near to it as possible. We try to use some aid in the first stage to ease the patient and give her confidence to carry on through the procedure. The best here is morphine sulphate, gr. ¼, and sodium amytal, gr. iii, repeated as needed.

I will now take anesthetics used and discuss them as to use in country practice.

"Twilight sleep" (morphia, gr. ¼ and scopolamine, gr. 1/200) has been and can be used in the hospital, but not in the country because it cannot be controlled without trained help to give repeated doses of it. Statistics estimate from its use an increased infant mortality of 1 to 2 per cent; labor is often prolonged in the second stage, causing an increase in instrumental deliveries, thus lacerating mother and endangering baby, and the patient often has to be restrained by mechanical means; so, of late years, this has been discarded by most good obstetricians even in hospital practice. Gwathmey's method of rectal anesthesia is very popular in hospital work, but is not practical in the country on account of expense, considerable amount of apparatus needed and a nurse to watch the patient; also, it cannot be controlled at home, and after it is given we can only wait and hope all will be well.

Spinal anesthesia will not do in the country, because the technique of administration is difficult. Position of the patient after the injection is given has to be thoroughly understood or you will get a failure or even a fatality; the duration is too short to be of much use in the first stage, and we cannot control it after it has been given. Often there follows a prolonged labor, for it relaxes the abdominal muscles so they do not help expel the foetus. In the country we have likewise no one to check the blood pressure and pulse of patient.

The gases, ethylene and nitrous oxide, I will touch lightly, as they are not practical for our use. Ethylene is highly inflammable if used near an open lamp, which most of us are accustomed to use in our work. Nitrous oxide needs a trained anesthetist, expensive apparatus, is expensive, and does not relax the patient as does ether or chloroform. Ether is claimed by some authorities to be the best anesthetic most easily adapted to all occasions. I differ from them for the reasons that ether

gives off an inflammable vapor which may explode by lamp light; it causes nausea and vomiting which are liable to bring on postpartum hemorrhage; there is more danger of pneumonia, the bulk is greater, action slower, reaction longer, relaxation less complete in as short a time, and is not as easily controlled as chloroform.

Chloroform in my humble experience and opinion is the best anesthetic for the country physician, in respect to the points I mentioned at first—safety to the mother, safety to the baby, use at any place since it will not explode, will relax the perineum, can be easily controlled, has small bulk and cost, and anyone can administer it with drop bottle, or patient can hold inhaler to her own nose, dropping it when she relaxes enough.

I base my belief on 339 cases on which I have used chloroform as anesthetic in the past five years. Reviewing these, I find one maternal death; patient had what looked to be a cerebral hemorrhage after giving birth to a hydrocephalus baby. Therefore, I did not blame the chloroform. Having had only one death in 339, I think it safe for the mothers, as I have followed them closely in many cases for four or five years after delivery. Eight of the babies were still-born, so I consider it safe for the babies.

I use chloroform entirely in the second stage, morphine or sodium amytal in the first.

Start chloroform at the beginning of second stage and gradually increase amount until we have complete relaxation when the head reaches the perineum; then the head can be delivered between pains, or an episiotomy done if necessary. The patient is not conscious of the head passing over the perineum.

Now, if the pains lag under the anesthetic, I use 3 to 5 drops of pitocin, controlling the pains with my hand on perineum, and increasing or decreasing chloroform.

The perineum is usually relaxed, as I have had few bad tears even in primipara. The anesthetic can be stopped at any time, and is easily controlled. The patient reacts easily, with no nausea or vomiting and no shock. Babies cry almost at once, with little resuscitation and, in my observations, no after-effects. Therefore, as I said before, in my opinion chloroform is the best anesthetic for the country physician.

DIABETIC COMA—A REPORT OF TWENTY-TWO CASES.*

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This is a survey of twenty-two patients with severe diabetic acidosis who were studied in the Hospital Division of the Medical College of Virginia in the last four years. The usual clinical and laboratory criteria were considered in establishing the diagnosis and we feel relatively certain that these cases are typical of the acidosis occurring in diabetes. There were, however, in certain of the cases, complicating factors which apparently had marked effects on the prognosis.

Notwithstanding the marked improvement in the handling of the diabetic patient since the advent of insulin therapy, diabetic acidosis is still a serious problem. For that reason the diabetic patient should always be under close surveillance and should be advised and forewarned accordingly. In general, acidosis develops for three reasons: (1) dietary indiscretion, (2) the omission of insulin, or (3) the onset of infection. The physiological disturbance that ushers in the coma symptom-complex is not entirely clear. In general there is an increase in the blood sugar, a reduction of the carbon dioxide combining power of the plasma, and an increase in the ketone bodies of the blood and urine. Coma may occur, however, when at least one of these findings is normal. Lemann, Oliver, and Evans have all reported cases of diabetic coma in which acetone bodies were not demonstrable in the urine. On the other hand, the blood sugar may be very high (1,710 mgs. per hundred c.c.) without the advent of acidosis. At any rate, the occurrence of coma is the end result of a profound metabolic disturbance in which fatty acid intoxication and hyperglycemia are the rule rather than the exception.

In analyzing our case records we find the usual symptoms and signs occurring. Weakness, nausea, vomiting, headache, and increasing drowsiness were the principal complaints. Two patients complained of severe abdominal pain, so severe that an acute surgical emergency was suspected until the true state of affairs was determined. The physical phenomena encountered on examination were also characteristic. Dehydration, soft eyeball, and Kussmaul respirations, were noted in most of

*Read before the sixty-second annual meeting of the Medical Society of Virginia, at Roanoke, October 6-8, 1931.

the cases. The body temperatures in this series were not markedly reduced. The highest temperature recorded on admission was 99.6 degrees F. and the lowest 96.8 degrees F. In half of the cases there was a note that the observer detected the odor of acetone on the breath.

The laboratory findings in all of our cases were essentially true to type. The blood sugar was in every instance elevated; the urine showed marked glycosuria and ketonuria invariably, and the carbon dioxide combining power was uniformly very low except in four instances where the determination was made several hours after treatment was instituted. The average leukocyte count on admission was 13,500, varying from a low of 4,400 to a high of 24,200. In twelve patients, the count was over 10,000. In the favorable cases the counts returned to normal as soon as the dehydration was relieved.

The essential principles of therapy were the treatment of shock, the administration of fluids and the use of insulin in frequent doses. Gastric lavage was employed especially in the cases in which vomiting was present. We believe it to be an extremely valuable adjunct in treatment. It rids the stomach of undigested and partially digested residue and enables the patient to retain food and fluids much sooner than otherwise would be the case. Aspiration of the stomach also reduces the size of the distended organ which in the dilated condition may interfere with respiration.

Inasmuch as dehydration was such an important factor in the production of the clinical picture, attempt was made to restore the fluid content as rapidly as possible. Glucose in 5 per cent solution was given intravenously in amounts varying from five hundred to one thousand c.c. twice or three times within the first twenty-four hours. Frequently after the first administration the patient became conscious to the extent that fluids might be taken by mouth, and from then on fluid regulation was much easier. The amount of insulin used was variable. The largest amount given in this series was two hundred and fifty-five units in twenty-four hours, while the smallest was eighty units in twenty-four hours. Our method is to give from twenty to fifty units intravenously on admission and follow with thirty units every hour for three or four doses. No definite rule can be stated—each case requiring

TABLE I

Total No.	Average Age	Oldest	Youngest	Males	Females	White	Colored
22	34.7	52	6	6	16	14	8

TABLE II

Total No.	Total No. Deaths	Per Cent	Coma Alone	Per Cent	Coma with Complications	Per Cent
22	8	36	2	9	6	27

TABLE III

FATAL CASES

Name	Age	Sex	Race	No. Hrs. in Coma on Admission	Blood Sugar	Co_2 Vols. Per Cent	Complications	Time in Hospital
L.G.	52	F	W	?	530	10	Pul. Tbc.	5 hours.
F.G.	6	F	C	36	380	.....	.....	8 hours.
S.T.	45	F	W	36	480	11.8	Abcess of Leg.	16 hours.
B.M.	7	F	W	12	540	13.5	.....	17 hours.
R.M.	38	F	C	8	450	39.2*	Gangrene of right foot and leg.	12 hours.
A.H.	50	F	W	24	410	34.2*	G. U. Tract infection.	7 weeks.
M.J.	53	F	C	24	330	16.4	Mycocardial insuffiency.	12 days.
P.M.	50	F	C	6	540	.....	Cerebral Hemorrhage.	6 days.

* Determination made after treatment was begun.

a different amount. When the patients became sufficiently conscious to take fluids by mouth, they received a carbohydrate-containing liquid, usually orange juice sweetened with a small amount of cane sugar. This was mixed so that each six ounces contained twenty-five grams of carbohydrate. It was given every two or three hours. Insulin in the ratio of one unit per gram of carbohydrate was administered at the same time. We realize that there are those who oppose the administration of carbohydrates in large amounts, but we believe the furnishing of food, and the restocking of glycogen-poor tissues are useful therapeutic aids.

In general, the disappearance of acidosis was noted in the laboratory examinations before it was detectable clinically. Ketonuria had usually decreased and the carbon dioxide combining power of the blood had increased hours before the patient's drowsiness and air hunger had perceptibly lessened. The reason for this phenomenon is that time is required for the restoration of normal physiologic function even after the causative factors of acid intoxication have been counteracted.

The mortality rate in our series, when one considers the total number of deaths, is quite large. As may be seen from Chart III, there were eight deaths out of a total number of twenty-two patients. Of these eight, however, only two died from uncomplicated coma. In three patients death occurred after the clinical and laboratory phenomena of coma had disappeared, as may be noted in the chart. These patients apparently succumbed as the result of infection in the genito-urinary tract, myocardial insufficiency and cerebral hemorrhage, respectively. Three other cases had as complicating factors pulmonary tuberculosis, abscess of the leg and gangrene of foot and leg. These patients all died within a short while after admission. The two apparently uncomplicated fatalities occurred in children. They had both been in coma for relatively long periods of time, and this, of course, is of serious import as far as the prognosis is concerned.

Unfortunately, permission for necropsy was obtained in none of the fatal cases. As Joslin has so aptly stated, diabetic deaths often cause us to lose faith in insulin until post-mortem findings show the hopelessness of the situation and renew our confidence in this most valuable therapeutic agent. It is probable, at least, that some of our deaths may be explained by the occurrence of some unrecognized or unrecognizable pathologic lesion that would entirely vitiate the normal usefulness of the extract of the Islets of Langerhans.

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THE ETIOLOGY AND TREATMENT OF ENURESIS.*

JOHN S. WEITZEL, M. D., Richmond, Va.

The fallacy of selecting certain etiologic factors and inaugurating a specific course of treatment for the cases of enuresis coming under our observation becomes more apparent when this condition is carefully reviewed.

No condition, in my judgment, presents as vague a picture as the average child with enuresis, and no condition, common as it is among children, can cause as much mental distress both to the parent and child.

In reviewing the literature it is very difficult to present this subject in a brief and concrete fashion; however, in considering the etiology, Wylder, in the *Medical Journal and Record*, March, 1926, makes this enlightening statement: "In the first place enuresis is not a disease but is only a symptom that may be caused by many conditions of widely divergent pathology and much that has been written that seems to be almost contradictory is absolutely correct, for the different authors are describing different cases with entirely different causations."

*Read by title at the sixty-second annual meeting of the Medical Society of Virginia, in Roanoke, October 6-8, 1931.

I consider enuresis to be satisfactorily divided into two classes, enuresis vera and pseudo-enuresis.

Adrien Bleyer, in *Am. Jour. Dis. Children*, November, 1928, defines enuresis vera as that type of enuresis in which dissociation between the brain and the voluntary nervous system, as concerns the *physiology* of *micturition*, actually appears to exist, while pseudo-enuresis is reserved for that type of defective control which can be relieved by measures designed to influence the will or to obtain the cooperation of the child.

It is somewhat difficult in some cases to draw a line of demarcation between enuresis vera and pseudo-enuresis. We know from experience that the average case presents no tangible anomaly or infirmity, definitely causative in nature.

Anatomically there seems to be a vesicular atony, involving the sphinchter, which could be reasonably based on a neurosis. This anatomic or physiologic peculiarity does not reside external to the orifice of the bladder. Enuresis in effect, therefore, would be a disturbance of the physiology of micturition, due to a disturbance in the bladder itself, which places it beyond the control of the will.

Under the heading of enuresis vera I might mention the following causes—cystitis, renal or vesical calculus, adherent prepuce, balanitis, phimosis, epispadias, hypospadias, narrow-meatus, pin-worms, anal fissure, rectual polypus, vulvo-vaginitis, adherent clitoris, skin diseases, syphilis, tuberculosis, alteration of the thyroid or pituitary gland, urethral stricture, congenital anomalies of urethra, spina bifida occulta, dysenteric ulceration, and chronic congestion of the lower bowel, as also endocrine disturbances, such as cretins, congential myxodema, mongols and other types of idiocy. Likewise vesicular atony, neurosis, either unstable or undeveloped nervous systems that interfere with the cerebral control over the spinal center must be considered. This deficient cerebral function is expressed by the failure of the reflex which contracts the urethral sphincter when the vesical tension enters into action. Other conditions that might be mentioned are anemia, malnutrition, inherited nervous constitution, chorea, epilepsy, hysteria, headaches, neuralgia accompanied by lack of tone of the vesical sphincter, highly acid, highly concentrated or highly alkaline urine and excretion of large amounts from excessive fluid intake, in addition to which we might add heredity such as alcoholics or epileptics, enlarged or diseased tonsils, and adenoids.

The age of the child is usually from five to seven years. Seasonal changes, such as mid-winter, indicating the hygroscopic and barometric effect on the mechanism of micturition, hyperesthesia or hypoesthesia, hypertonia or hypotonia of the vesical sphincters are all to be borne in mind.

Under the heading of pseudo-enuresis I might mention the following causes—vagatonias produced by psychic stimuli, extreme nervousness and neurasthenia, and, lastly, habit, such as masturbation, etc.

To refresh our memories I might mention a few of the salient points in the physiology of normal micturition. While urine is accumulating in the bladder the organ performs rhythmic movements. These gradually increase in force until some urine is forced past the internal sphincter and then micturition takes places reflexly. The passage of a few drops of urine through the internal sphincter stimulates the sensory nerve-endings of the pelvic nerve; as a result, the sphincter of the bladder is reflexly inhibited, and the bladder muscles contract and void the contents. Micturition is therefore a reflex act, the spinal center for which is situated in the lumbar spinal cord. In infants urine is voided by the stimulation of the sensory nerve-ending of the pelvic nerve. After eighteen months or certainly by three years of age this reflex is under cerebral control unless this cerebral control is cut off by excitement.

Kerley mentions faulty development as a cause of enuresis, but states that in about ninety per cent of cases the cause is unexplained.

Abt mentions acid urine, alkaline urine, malformation of the bladder and urethra, epilepsy, spina bifida, spina bifida occulta, compression, myelitis, cerebral lesions, fistula and oxyuris.

Holt enumerates a continued infantile condition, anything increasing irritability of the spinal center, anything interfering with cerebral control over the center and anything increasing irritability of the terminal filaments of the bladder nerves.

Church and Peterson speak of it as a partial somnambulsim and as a physiological stigmata of degeneration.

White and Martin call it a functional disease of unknown cause.

Porter and Carter give as the principal cause, improper training, and the establishment of a neurotic habit.

Feer mentions faulty training, nocturnal epilepsy, juvenile hysterics, and considers it an evidence of a hereditary stigmata of degenerative inferiority.

Crozer Griffith discusses phimosis, preputial adhesions, adherent clitoris, vulvo-vaginitis, balanitis, renal calculus, rectal fissure, thread worms, adenoids, foreign bodies in the nose, vesical calculus, hyper-acidity and hyper-alkalinity of urine, malnutrition, anemia, chorea, epilepsy, headache, neurasthenia, hysteria, improper food or clothes, fright, excitement, thyroid insufficiency, fatigue, and too heavy bed covers.

This discussion of causes could be carried on *ad infinitum*, as every text consulted or every author reviewed brings out some new suggestions as to causation, which emphasizes the fact that there is not at the present time any very definite idea as to the cause or, rather, there is a general idea pervading the literature that anything that disturbs us either mentally or physically may give rise to this symptom.

I. J. Muldower, in *Archives of Pediatrics*, July, 1927, believes that enuresis has a definite relation to vagotonia, not the vagotonias of inferiors, but vagotonias who are not only normal but above normal. He mentions two children who developed severe attacks of vomiting when they started to school, so much so that it was necessary to keep them at home for sometime. Their progress on resuming school was brilliant. To my mind these children were vagotonics.

"You tell people shocking news, and with what results? Some will develop indigestion, others will faint, while still others will have incontinence of feces or urine, such stimuli as would hardly effect a non-vagotonic. The above illustrates vagotonic manifestations produced by psychic stimuli.

"Examples of vagotonia caused by manifest endocrine stimuli are shown by palpitation, tremors, flushing, etc., as in Graves' disease, and flushing, sweating, abnormal fear and nervousness as in puberty and menopause. Bearing the above in mind, may we not deduce that since in simple goitre and symptomless puberty and menopause where there are manifest changes in the endocrines, may we not also have vagotonic manifestations with presumed or latent disturbance of the endocrines?

"Peripheral stimulations are found in vaginitis, adherent clitoris, phimosis and pinworms."

Most of Muldower's cases showed frank symptoms of general vagotonia, in addition to which was local vagotonia. If what was said is true, we can easily understand why fear of the teacher, parent, or another child, reprimand; sensitiveness of its being superior or inferior in performing its tasks at school or play; and other minor irritations, mental and physical, of no consequence to the normal child, will so effect a vagotonic as to cause incontinence. The same holds true of children who are under school age. So much for enuresis diurna.

"To explain nocturnal enuresis we must not forget that, of all human beings, children are the most imaginative and hence are prone to dreams. Thus, dreams of a fight, or falling off the bed, of drowning, of being bitten by a dog, will cause nocturnal enuresis. These children will frequently be affected by very pleasant and excitable dreams. It is well known that when a normal child becomes feverish it becomes incontinent. This is explained first because there is irritation of the sympathetic nervous system, and, secondly, because such patients have dreams or phantasies. This, I believe, is the logical explanation of the modus operandi of enuresis."

Treatment

With the etiologic factors varying so greatly, it is so evident that views concerning therapy would be unsettled.

In every case the treatment must be guided by the most probable etilogic factor, after the elimination of which your attention should be applied to the general toning of the body, careful bland diet, avoiding coffee, tea, sweets, the usual fluid intake routine, fresh air, and avoidance of physical and mental strain. A moderately hard bed, covers not too warm, should be used, and mental excitement and late hours should be avoided.

For hypertonia, bromides and belladonna should be used, and some authorities are reporting excellent results from pituitary extract. For hypotonia, nux vomica or strychnia are advisable. Coillog, Rankowistich and Wertinghoff suggest massage of the bladder and electricity for toning up the vesical innervation. It is helpful to use psychic influence,

such as avoiding public exhibition, avoiding late hours, insisting on rest at mid-day with every precaution to avoid fatigue. Principal meal should be given at mid-day. Systematic and periodic emptying of the bladder is advisable. Careful cystoscopic and proctoscopic examinations are to be made if necessary.

Potassium citrate for highly acid urine, or dilute nitro-muriatic acid for highly alkaline urine are to be used when indicated. General tonic treatment with iron, arsenic, etc., is helpful.

The pasage of cold urethral sounds has been very successful in the hands of some authorities.

Systematic waking at night to prevent the bladder from becoming over distended should be practiced.

Education of the sphincter of the bladder by having the child, when he goes to urinate, practice the stop-start routine, as long as the urine lasts, educating and developing the sphincter muscles in this way.

Some authorities recommend the injection of saline solutions under the skin in the perineal and pubic regions, elevating the foot of the bed, discontinuing fluid after four P. M., encouragement and rewards.

Rewards in my experience, after the anatomic abnormality has been removed, and in cases when no abnormality was found, have been very successful, paying the child and taking it away for a dry or wet bed as the case may be.

Crothers, in *Clinical Pediatrics*, mentions in detail the customary method advised for enuresis in an out-patient department. You are all probably familiar with this. He states his great objection to the plan is that all the work is put upon the mother. A better way is to lift from the child the weight of exasperation and of emotion with which he has been surrounded, and teach him how to behave himself. In order to carry out the training plan, it is essential to make it easier to stay dry than to become wet. Instead of taking the child up at regular intervals, he suggests making the child get up itself, and when the bed is found wet, making the child get up half hour earlier, washing and drying its own bedclothes. He does not restrict water, nor does he restrict the diet, and uses no drugs. Rewards, but especially recognition of good work, are used at discretion. He states that he has used it in children from two and one-half years up.

Investigation of the intellectual level of the patient might be indicated.

Stimulation of the sympathetic nerves by applying pressure to any points of tenderness along the spine has been suggested. We might go on and find other suggestions, but this is sufficient to show that there is no uniformity of ideas as to treatment. This fact, however, stands out that belladonna or atropine are, or seem to be, the stand-by for all, or nearly all, cases; and yet, what does belladonna do, and how does it act?

Hare says it is eliminated through the kidneys almost as rapidly as it is absorbed from the stomach. If it is a sedative to unstriated muscles, does it not tend to relax the unstriated muscle of the vesical sphincter and increase the incontinence? And if it is excreted almost as soon as it is absorbed from the stomach, what local effect on the terminal nerve filaments can we expect if we get the child up frequently to empty the bladder, or if he empties it involuntarily in bed!

Paul Freud, in the *Medical Clinic*, November, 1925, reports a simple and harmless method which gave him good results. He based his treatment on Head's discovery that there is a reflex sympathy between the internal organs and those skin zones which derive their sensory nerves from the same segment of the spinal cord. On disease of an internal organ the corresponding skin zone shows hyperesthesia. Conversely, stimulation of such a skin zone causes hyperemia and, therefore, increased function of the corresponding organ. It was necessary to find a stimulus that would cause intense and long-continued hyperemia of the organ without injuring the skin. A degree of heat high enough for the purpose burns the skin. But intense cold applied to the skin for a little while causes long continued hyperemia of the organ. So he used ethyl chlorid on the Head's skin zone corresponding to the bladder in 23 cases of enuresis nocturna. The skin areas to which the cold was applied remained hyperemic for a long time. The bladder is innervated by the 2nd and 4th sacral segments; so the cold was applied over the sacrum and in a few cases just above the symphysis over an area as large as the palm of the hand. Generally one or two applications at intervals of 3 to 4 days were enough to cure the condition

which in 15 of 23 cases had lasted longer than 2 months.

In summarizing the etiology and treatment of enuresis diurna and nocturna, our natural deductions compel us to state:

1. So far, no single definite etiologic factor has been found to account for enuresis.

2. Stimulation of the sympathetic nervous system in vagotonics is an important factor.

3. No fluid should be taken after four P. M. A two to three-hour rest after the mid-day meal is essential.

4. Empty the bladder before retiring, and again at midnight.

5. Encouragement with gold star chart or money stimulates the subconscious control over the higher centers and strengthens the will.

6. Medicines have proven to be of no direct benefit.

Aside from anatomical and physiological abnormalities, I believe the large percentage of these cases are simply a habit condition, and with sympathy and encouragement, together with the proper regime and care, this habit can be broken.

Maury Place.

Miscellaneous

Practical Rules for Mental Health.*

1. Neither run away from emotions nor yet fight them. . . . It is like guiding spirited horses—you guide, they obey, not their own impulses, but your will.

2. Be efficient in what you do. . . . In short, do not drive your tacks with a sledge-hammer. There is a better, less fatiguing way. Find out how easily you can do things well, and take pride in such skill.

3. Do one thing at a time.

4. Make clean-cut practical decisions. . . . Finally decisions must be valued, not as irrevocable oaths or unretractable contracts, but as mere decisions, subject to change in the face of new facts or additional knowledge.

5. Do not accept hurry as a necessary part of modern life. . . . Quality of work, not quantity, spells success, and quality is destroyed by hurry.

6. The worst enemy of efficiency, as well as the best ally of nervousness, is worry. Worry is a complete circle of inefficient thought whirling about a pivot of fear. To avoid it, consider first whether the problem in hand is actually your business. If it is not, turn to something that is. If it is your business, decide next whether it be your business now.

7. Keep work, play, rest and exercise in their proper relative proportions; not only in the space of decades, but year by year, month by month, week by week, and day by day. . . . Such a life absorbs emergencies without strain.

8. Shun the New England conscience.

9. Energy is often wasted by a peculiar process which many people seem to think necessary before they can do anything, especially anything that promises to be difficult. . . . When a decision has been reached, when something has to be done, waste no time in mobilizing extra energy, just do it.

10. Lastly, to avoid breaks in character, breaks between your ideals and your everyday actions, recognize that your problem is fundamentally the same as every one else's, no matter what your particular job may be. . . . Do not criticize your part in the play, study it, understand it, and then play it, sick or well, rich or poor, with faith, with courage, and with proper grace.

*Formulated by Austan F. Riggs, M. D., in "Just Nerves." See "The Normal Mind," by William H. Burham, Ph. D., page 671.

Child Tuberculosis and the Doctor.

The following points in tuberculosis control, stated by Dr. Roy K. Flannagan, Director of the Tuberculosis Out-Patient Service of the State Department of Health, are known to many physicians but are often overlooked in practice:

1. Tuberculosis is not killing as many people as formerly, but it is still recorded as the most fruitful cause of death.

2. Tuberculosis is surely infectious to intimate contacts. Tuberculosis, before it is known to be tuberculosis, breeds tuberculosis.

3. After infection has taken place tuberculosis is slow in manifesting itself, giving ample time for cure.

4. In every home in which there is or has been a recent case of tuberculosis, there are other latent cases always. Though slow it is sure.

5. These latent cases keep the disease alive in the community. They should be found.

6. It is possible to find early cases of tuberculosis, even in babyhood.

7. It is the duty of the family physician to find the child tuberculosis latent in the families in which he practices.

8. The discovery of latent cases by a physi-

cian in the families of his clientele is not difficult.

9. The tuberculin intradermal test for tuberculosis is simple and accurate.

10. The intradermal tuberculin test is made just as in giving the Schick test for diphtheria, by injecting intradermally (not subcutaneously) with a fine needle and a graduated syringe .1 c.c. of a 1 in 1000 dilution of Old Tuberculin and reading the reaction on the second day thereafter. If the reaction is negative, another injection of .1 c.c. of a 1-100 dilution is given for a reading after another forty-eight hour interval. If still negative infection with tuberculosis may be considered absent.

11. The reading and interpretation of the tuberculin reaction may be readily learned by those unfamiliar with it. A verbal description is inadequate, the reading must be demonstrated.

12. A positive tuberculin reaction in a child though definitely indicating infection with tuberculosis, does not necessarily indicate cause for alarm or need for extraordinary measures. It *does indicate* need for careful physical examination, for an X-ray diagnosis, for necessary corrective measures, for care as to diet and exercise. The parent should know all the facts, but the child should rarely be told that he is sick and he should not be treated as though he were, and certainly the public should not be informed. He should, however, be kept under medical observation until beyond puberty.

13. The tuberculin X-ray unit of the Out-Patient Service of the State Health Department is a demonstration and consultation service simply, and is at the service of physicians.

14. Physicians are urged to utilize this service as an aid in dealing more adequately with their own tuberculosis problems.

Should there be sufficient demand, tuberculin test material at moderate cost will be distributed by the Out-Patient Service to physicians who wish to test children in their practice.

THE MAN WHO WINS

The man who wins is the man who does,
The man who makes things hum and buzz.
The man who works and the man who acts,
Who builds on a basis of solid facts,
Who doesn't sit down to mope and dream,
But who humps ahead with the force of steam,
Who hasn't time to fuss and fret,
But gets there every time—you bet.

—*Selected.*

Woman's Auxiliary, to the Medical Society of Va.

PRESIDENT—*Mrs. J. Allison Hodges*, 5511 Cary Street Road, Richmond.
PRESIDENT-ELECT—*Mrs. W. P. McDowell*, Larchmont, Norfolk.
SECRETARY—*Mrs. James K. Hall*, 3011 Seminary Avenue, Richmond.
TREASURER—*Mrs. Reuben F. Simms*, 2034 Park Avenue, Richmond.

President's Message.

The American Medical Association convention will be held in New Orleans, May 9th-13th, and, of course, the Woman's Auxiliary will convene at the same time. A delightful program has been arranged and a cordial invitation has been extended by the hostess Auxiliary.

It will be a wonderful opportunity to see this historic old city. Many of the quaint customs and old homes of its early French settlers still remain and these give New Orleans a glamour and an atmosphere of romance different from any other city in America. We hope many will take advantage of this privilege and that Virginia will have a large representation.

Mrs. Hodges requests that any ladies who expect to go to New Orleans communicate with her AT ONCE, so she can send the Credential cards, etc., to them.

All ladies are invited to attend the business sessions and social functions regardless of whether they are delegates or not.

Many Auxiliaries report they have adopted the Study Program recommended by the National Auxiliary and find it gives zest and interest to their meetings.

We are glad to report that the new president of the Richmond Auxiliary, Mrs. Lee E. Sutton, has appointed Mrs. Joseph Bear as Program Chairman. She has planned a series of medical subjects to be studied and discussed at the monthly meetings. We need this "self-education," for, as a rule, doctors' wives are not well-informed and depend too much upon their husbands. Medicine, perhaps more than any other science, is making rapid strides and we must study to keep in touch with its wonderful developments. We hope other Virginia Auxiliaries will be inspired to do likewise.

Dr. William F. Drewry, Director of the State Bureau of Mental Hygiene, gave an address before the Woman's Auxiliary of the Richmond

Academy of Medicine on February 26th. The subject of his address was "Why Interest in Mental Hygiene?"

Preliminary Program
for
Woman's Auxiliary
to the
American Medical Association
Tenth Annual Meeting
New Orleans
May 9-13, 1932
Headquarters: Jerusalem Temple,
1137 St. Charles Avenue

Monday, May 9, 1932

6:00 P. M.—National Board Dinner and Pre-Convention Meeting (for Board Members, only), Orleans Club, 5005 St. Charles Ave. Tickets $1.50

Tuesday, May 10, 1932

9:00 A. M.—General Meeting----Jerusalem Temple
Mrs. Arthur B. McGlothlan, presiding
12:30 P. M.—Buffet Luncheon----Jerusalem Temple
Tickets $1.00
2:00 P. M.—Walk through Vicux Carre, with guides. Starting from the Patio Royale.
4:00 P. M.—Tea----Patio Royale
8:00 P. M.—General Meeting of the American Medical Association----Auditorium

Wednesday, May 11, 1932

9:00 A. M.—General Meeting----Jerusalem Temple
Mrs. Arthur B. McGlothlan, presiding
12:30 P. M.—*Auxiliary Luncheon,
Southern Yacht Club
(12 minutes from Canal Street or Jerusalem Temple. Luncheon tickets, $1.50; transportation, 25 cts.)
2:30 P. M.—Post-Convention Board Meeting,
Southern Yacht Club
2:30 P. M.—*Through Garden Gates; Glimpses of New Orleans.
4:00 P. M.—Teas in Private Residences.
New Orleans Country Club
8:30 P. M.—Divertissements in the Garden.
10:00 P. M.—Buffet Supper.
Negro Spirituals—Courtesy of the Woman's Auxiliary to the Louisiana State Medical Society.

Thursday, May 12, 1932

9:00 A. M.—General Meeting----Jerusalem Temple
Mrs. Walter Jackson Freeman, presiding
10:00 to 10:50, and
11:00 to 11:50—Special Round Table Conferences,
Jerusalem Temple
12:00 M.—Buffet Luncheon----Jerusalem Temple
Tickets $1.00
1:00 P. M.—*Trip to Oak Alley Plantation; visiting Spillway. Returning at 6:00 P. M. (Round trip, $2 per person)
or
2:00 P. M.—*Round trip over Lake Pontchartrain, via New Bridges. ($2 per person)
or
2:30 P. M.—*Trip to Versailles Plantation, Battle Field of New Orleans; Docks and Wharves (Round trip, $1 per person)
or
2:30 P. M. —*Delgado Museum and City Park; Newcomb Art School and Audubon Park (Round trip, $1 per person)
or
2:30 P. M.—*Mayan Exhibit----Tulane University
(Round trip, 25 cts. per person)
9:00 P. M.—President's Reception and Ball,
Auditorium

Friday, May 13, 1932

9:00 A. M.—*Trip to Gulf Coast—Leaving L. & N. Station at 9:00 A. M., returning to New Orleans at 6:00 P. M. (Round trip, including luncheon and beautiful scenic drive along the coast, $6.00 per person)
10:00 A. M.—Golf Tournament---Metairie Golf Club

*Transportation paid by individual
All trips start from Jerusalem Temple

All women attending the convention are invited to participate in this entire program whether they are members of the Auxiliary or not.

Items of Interest.

The following items in regard to work being done by the various Auxiliaries are from the monthly report prepared by Mrs. Milton P. Overholser, Harrisonville, Mo., chairman of the Committee of Press and Publicity of the National Auxiliary:

Hygeia

In his annual report to the A. M. A. House of Delegates, Mr. F. V. Cargill, circulation manager, states that the Auxiliary is the only source from which *Hygeia* subscriptions are received that showed a gain in 1931 over 1930.

In addition to personal subscriptions, the Auxiliaries have sent *Hygeia* to State legislators, to city, rural and parochial schools, Y. M. C. A.'s, Y. W. C. A.'s, Parent-Teacher Associations, Red Cross, Visiting Nurses' Associations, Libraries, Judges of County Courts, and to other places where they thought the magazine would serve a useful purpose.

South Carolina

The Editor of a recent *Journal of the South Carolina Medical Association* writes of the Auxiliary as follows: "The South Carolina branch of this great National Organization is moving along in a splendid way. Some of the larger cities have engaged in activities of major importance to the health of the people. One of the projects is that of promoting the circulation of *Hygeia*, the greatest health magazine ever published in the United States. Another most worthy aim is that of establishing a Student Loan Fund with the idea of providing aid, where needed, for the sons and daughters of our medical men who desire to attend our medical schools."

In "Reciprocity Day" the large Greenville, South Carolina Auxiliary carried out recommendations of the National Educational and Public Relations chairmen. On this day repre-

sentatives of all Women's Clubs were invited to meet with the Auxiliary. Instructive addresses on the timely subjects of "High Blood Pressure" and Correct Posture, were given by two local physicians, followed by interesting questions from and discussions with the audience.

The South Carolina Auxiliary is making a splendid record this year in its two outstanding objectives; *Hygeia* and the Student Loan Fund. For the latter, $2.00 per member is the goal set.

Minnesota

The Organization and Public Relations achievements in Minnesota are worthy to be known and read by all Auxiliaries. A high percentage of Minnesota's counties are organized 100 per cent. A fine item in the Public Relations report has to do with an essay contest on the subject of Tuberculosis. To the high school boys and girls in the State, the Minnesota Auxiliary gave two loving cups for essays on Tuberculosis. From the 173 essays received ten were selected as the best. The writers of these were brought to Minneapolis one at a time, and the essays were broadcast over WCCO. Much publicity was given the Auxiliary and this project through the Twin City papers. These essays were printed, widely read, and much discussed.

New Mexico

It is interesting to know that the State Auxiliary of New Mexico is one with the Auxiliary to the Albuquerque Medical Society. The members are getting acquainted and playing together this year; and, as Auxiliary women inevitably do in their social relations, they are no doubt forming unexpected and delightful friendships.

Truth About Medicine

In addition to the articles enumerated in our letter of January 29th, the following have been accepted:

Abbott Laboratories
  Bismo—Cymol
Calco Chemical Co., Inc.
  Trichlorethylene—Calco
    Tubes Trichlorethylene—Calco, 1 c.c.
Riedel-de Haen, Inc.
  Decholin
    Decholin Tablets, 3¾ grains
  Decholin-Sodium
    Ampoules Solution Decholin-Sodium, 5 per cent, 10 c.c.
  Ampoules Solution Decholin-Sodium, 20 per cent, 10 c.c.

E. R. Squibb & Sons
  Iodobismitol—Squibb
Nonproprietary Articles
  Sodium Iodobismuthite
  Trichlorethylene

The following article has been exempted and included with the List of Exempted Non-medicinal Articles (New and Non-official Remedies, 1931, p. 481):

Robert McNeil
  Lubricant—McNeil

New and Non-official Remedies

The following products have been accepted by the Council on Pharmacy and Chemistry of the American Medical Association for inclusion in New and Non-official Remedies:

Antimeningococcic Serum Polyvalent.—An antimeningococcus serum (New and Non-official Remedies, 1931, p. 355, marketed in packages of one double-ended vial containing 15 c.c., and in packages of two double-ended vials each containing 15 c.c. United States Standard Products Company, Woodworth, Wis.

Phenobarbital Sodium.—Sodium Phenylethylbarbiturate.—The monosodium salt of phenylethylbarbituric acid. The actions and uses of phenobarbital sodium are the same as those of phenobarbital. For hypodermic injection, phenobarbital sodium is used in the form of 20 per cent solution.

Phenobarbital Sodium—Gane and Ingram.—A brand of phenobarbital sodium—N. N. R. It is marketed in the form of tablets containing 1½ grains. Gane and Ingram, Inc., New York.

Sterile Solution Skiodan (40 per cent by volume).—Each cubic centimeter contains skiodan (New and Non-official Remedies, 1931, p. 779), 0.4 Gm. Winthrop Chemical Co., Inc., New York.

Brucella Melitensis Vaccine.—A bacterial vaccine obtained from B. melitensis (B. abortus), proposed for use in the treatment of undulant fever caused by the organism commonly known as Brucella abortus and not by the organisms coming from the goat.

Brucella Melitensis Vaccine—Lederle.—Brucella Abortus Vaccine.—A heat killed suspension of Brucella melitensis organisms (2,000 million per cubic centimeter). The product is marketed in packages of one 5 c.c. vial. Lederle Laboratories, Inc., Pearl River, N. Y. (Jour. A. M. A., February 6, 1932, p. 479).

Sodium Iodobismuthite.—Sodium bismuth iodide.—A compound formed by the interaction of bismuth chloride and sodium iodide in ethyl acetate solution, consisting essentially of hydrated sodium iodobismuthite (sodium bismuth iodide) with inorganic salts. It contains approximately 21 per cent bismuth, 62 per cent iodide and 11 per cent water of hydration. This bismuth preparation is claimed to have the quality of appearing in the spinal fluid and of penetrating the brain tissue.

Iodobismitol.—A solution of sodium iodobismuthite (sodium bismuth iodide) in ethylene glycol containing 0.1 per cent acetic acid. Each cubic centimeter contains sodium iodobismuthite equivalent to 0.012 to 0.0138 Gm. bismuth and 0.109 to 0.129 Gm. sodium iodide. Iodobismitol seems to be well absorbed and to be excreted fairly rapidly. The claim is made for it that it will penetrate the brain in a great majority of persons treated. E. R. Squibb & Sons, New York. (Jour. A. M. A., February 13, 1932, p. 554).

Foods

The following products have been accepted by the Committee on Foods of the American Medical Association for inclusion in Accepted Foods:

Knox-Jell.—A Gelatine Dessert (Charles B. Knox Gelatine Company, Johnstown, N. Y.)—Gelatine dessert preparations; containing sucrose, gelatin and citric or tartaric acid; colored with certified food color or vegetable color and flavored with terpeneless oil of lemon, lime, or orange, or raspberry or strawberry extracts. One package (1 pound 10 ounces), is claimed to make one gallon of dessert.

Propaganda for Reform

Insulin—A Protein.—The early investigations of insulin gave indications that it is either a protein or a protein-like substance or something closely associated with proteins in nature. Recent investigations make it extremely probable that insulin is a well-defined protein and that the physiologic activity of this hormone is a property of the insulin molecule itself or of some special group within it. (Jour. A. M. A., December 12, 1931, p. 1803).

The Administration of Suprarenal Cortical Extracts.—The efficacy of replacement therapy in cases of Addison's disease by the injection of suitably prepared extracts of the suprarenal cortex, freed as far as possible from the epinephrine liberated by the medulla of the gland, has apparently been established. For patients that tolerate intramuscular injection well, this is perhaps the preferable method of administration. The intravenous method is indicated when the patient is in crisis and an immediate response is necessary. The possibility of effective oral administration has recently been reported on. In cases in which prolonged treatment is demanded, the oral route may be of preferential utility. (Jour. A. M. A., January 2, 1932, p. 52).

"Infra-Red."—Under the incorrect and confusing name "Infra-Red" the Iodine Products Co., of Caney, Kansas, describes an office test to determine the degree of acidosis. The designation "Infra-Red" is applied to a "super-alkalized iodide." This test can do no more than determine the titratable acidity of the urine. However, this is not the method of choice in measuring the development of an acidosis. (Jour. A. M. A., January 2, 1932, p. 71).

Average Optimum Dosage of Cod Liver Oil.—The Council on Pharmacy and Chemistry reports that at present the recommended dosages of cod liver oil differ widely. In part, the varying effects that have been reported may no doubt be explained by the unlike activity of different brands of cod liver oil. Thus, while the U. S. Pharmacopeia permits the claim that the product is biologically standardized if it contains 50 vitamin A units per gram as determined by the method given, certain brands now in New and Nonofficial Remedies guarantee a potency of 1,000 U. S. P. vitamin A units per gram, and none contains less than 500 units. The vitamin D potency of cod liver oil is probably still more uncertain, since no official method of assay has been adopted; hence it is most difficult to compare different brands of cod liver oil even if the vitamin D potency and method of assay are declared. In view of the foregoing situation, the Council referee in charge of cod liver oil and cod liver oil preparations believed that some effort should be made to ascertain the amount of cod liver oil that must be administered under ordinary conditions to obtain the effects attributable to cod liver oil. With a view to obtaining an expression in regard to the dosage of cod liver oil, an inquiry was formulated and sent to nineteen pediatricians. From the replies received it was noted that little reference is made to the possible physiologic value of the vitamin A of cod liver oil, and that the consideration of dosage is expressed wholly in relation to the vitamin D content, or in terms of its effects in overcoming the relatively obvious physical manifestations of rickets. In all the opinions cited, the authors apparently recognize the added value of vitamin A and prescribe cod liver oil in preference to plain viosterol. Viosterol is favored, however, but only as a supplement, such as cod liver oil with viosterol 10 D. Most of the pediatricians quoted seem to agree on a dosage of three teaspoonfuls daily as amply sufficient to prevent and cure clinically evident rickets. In contrast to the practice of physicians in former years, most of the pediatricians begin the administration of cod liver oil at a time when the growth begins to accelerate—if not within two weeks, then at least before the end of the first month—reaching the maximum dosage usually during the third and rarely later than the fourth month, thus usually aborting the rickets in its earliest incipience and hence obviating the use of large doses later. There appears to be general agreement that it is only during these first two or three months of most rapid growth that the child requires its maximum dosage of cod liver oil, which may be continued as an ample dosage on up to two years of age. The Council has decided that a dosage of three teaspoonfuls (12 c.c.: 3 fluidrachms) daily, may tentatively be set as the standard optimum dosage of cod liver oil for the average infant at three months of age. (Jour. A. M. A., January 23, 1932, p. 316).

Thallium Poisoning.—The danger of poisoning by thallium has been reported on. Its use as a rodent poison originated in Germany about 1920. Later the remedy was introduced as a depilatory to be applied either locally as a cream or to be taken internally. During the past year or so medical literature has contained reports of severe poisoning following the use of a proprietary depilatory cream called Koremiu, which had for its active ingredient thallium acetate. In its action, thallium seems definitely to select nervous tissue. There is apparently no known certain antidote to the action of thallium. It is a cumulative poison of high toxicity, without taste, smell or other warning properties. (Jour. A. M. A., January 30, 1932, p. 406).

Dermal Absorption of Salicylates.—Salicyl esters such as methyl salicylate (oil of wintergreen) are commonly prescribed as constituents of ointments, liniments and local applications, on the assumption that they possess a greater skin penetration owing to their lipoid solubility, than do other salicylates. The amount of salicyl absorbed under these conditions would appear nevertheless to be too small for definite systemic effects. The salicyl compounds offer a good opportunity for testing the comparative importance of lipoid and water solubility, and of the chemical reaction (basicity and acidity) in dermal absorption. A recent study indicates that lipoid solubility may not be as important as some other factors. Moderate degrees of chemical reaction (basicity and acidity), possessed by substances appear to be more important than lipoid solubility for penetration of the skin. Alkalinity, which softens the skin, and acidity, which apparently hardens it, are more important than simple solution in the fatty secretion of the skin. (Jour. A. M. A., February 20, 1932, p. 643).

XUM

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Editorial

Adequate Maternity Care.

How the Medical Society of the State of New York is taking the lead in that State to teach the public the need for adequate maternity care is explained in an article appearing in a recent issue of the *New York State Journal of Medicine.*

A plan was approved by the Medical Society to send every physician in the State copies of a leaflet for distribution to patients, with the title: "A Message to Expectant Mothers and Fathers from the New York State Medical Society." This circular outlined the fundamentals of maternity hygiene advising medical care from the time the woman believes she is pregnant until the doctor says she is able to resume her regular activities and responsibilities and to care for her baby. It concludes: "Labor begins with pain in the back, with or without discharge. As soon as labor begins, send for your doctor. Take things easy until he gets there. Ask him NOW for his card or telephone number so you will be able to call him immediately. ATTACH HIS PHONE NUMBER TO THIS CIRCULAR AND PLACE IT IN A PROMINENT PLACE."

These leaflets were not sent to physicians directly by the Society, but through the cooperation of the Maternity Center Association of New York City, an organization which conducted a Mother's Day Campaign last year for adequate maternity care, and is planning another for 1932. A letter accompanied the circulars offering to send physicians additional quantities if desired, and the response from the medical profession was immediate and highly favorable. Newspaper accounts appeared in the press of the state, under such captions as: "Physicians Take Lead in Effort to Reduce Maternal Mortality;" "Members of Medical Society Distribute Standards of Better Maternity Care to Patients."

Copies of the "Message to Expectant Mothers and Fathers" will be sent on request to physicians outside New York State, according to information received from Dr. George W. Kosmak, Chairman Medical Board Maternity Center Association, 1 East 57th Street, New York City.

The Maternity Center Association was a logical instrument to promote this activity. It had already come into prominence for its own maternity work, a study of the records of 4,726 pregnant women cared for by the Association was made by Dr. Louis I. Dublin and published in the *American Journal of Obstetrics and Gynecology* (December, 1930). This report showed a lower maternal mortality rate for mothers cared for by the Association as compared with those mothers in the same district not under its care. The obvious difference in the care received by the two groups was that the Maternity Center Association group had early and constant medical supervision.

In 1930 the Maternity Center Association launched a year's Educational Campaign, which culminated on Mother's Day, May 10, 1931. Efforts were made to reach as many persons in this country as possible through publicity methods which stressed the facts that the puerperal death rate in the United States was un-

necessarily high, that it could be reduced by adequate and skilled obstetric care. The object of the Campaign was to educate the public in the essentials of such care. Daily and weekly newspapers, magazines and trade journals all over the country carried the material which the Maternity Center Association sent out. The Metropolitan Life Insurance Company, the Borden Products Company, and Parke-Davis and Company devoted newspaper and magazine display advertising to the importance of adequate maternity care. Governors and mayors issued proclamations and health commissioners wrote articles and broadcast over the radio; ministers preached sermons; news reels in every theatre in the United States showed campaign workers engaged in behalf of the work of the organization.

Dr. Greer Baughman, Chairman of the Maternal Welfare Committee of the Medical Society of Virginia, in commenting on this effort, says:

It is interesting to know what other states are doing to reduce the maternal and infant mortality.

Every movement seems to emphasize prenatal and postnatal care and tries to get the pregnant woman in touch with her doctor.

The Medical Society of the State of New York is recommending that leaflets be sent to the doctors of their State who in turn will distribute to their patients a pamphlet entitled "A Message to the Expectant Mothers and Fathers from the New York State Medical Society." These leaflets were not sent to the physicians directly by the Society but through the cooperation of the Maternity Center Association of New York City. Copies of the "Message to Expectant Mothers and Fathers" will be sent, on request, to physicians outside of New York State.

The Maternity Center Association was a logical instrument to promote this activity. It has already come into prominence for its own maternity work.

Insulin Therapy in the Non-Diabetic.

One has noted in the past few years observations on the use of insulin in non-diabetic conditions. Insulin therapy has been of signal value in the management of diabetics, but the use of this agent in the non-diabetic has yet to be proved as salutary practice. One's interest in this matter may be aroused by a study of Lueders and Watson.* Their effort was directed to discover whether insulin when applied to non-diabetics with malnutrition promotes normal secretion of pancreatic enzymes and whether the striking gains in weight in such a group may be attributed in part to an increased power of digestion and assimilation of food.

They note that other investigators have shown that the ingestion of the same amount of food without the use of insulin produces comparatively slight increase of weight. They bring out also that recently, physiologists have accepted the thesis of the increase of gastric and intestinal motility and the hypersecretion of the pancreas and liver under the effect of hypoglycemia incident upon the injection of insulin.

Twenty patients were employed in this study. The following diagnoses were made in this group of non-diabetics: achylia gastrica, four; pernicious anemia, three; gastroduodenal new growth, three; chronic eczema, two; giardiasis, two; visceroptosis, two; hyperthyroidism, one, and senility, one. Insulin was administered from fifteen to thirty minutes before breakfast and dinner. The diet consisted of high carbohydrates and fat. Sugar was given to relieve symptoms of hypoglycemia. A diet of 4,000 calories causes gain in weight. There was quantitative estimation of enzyme activity: amylolytic, tryptic, and lipolytic.

In eighteen of these patients with malnutrition, a measurable increase in concentration of pancreatic ferments was obtained. Accompanying this, there appeared in a number of these patients a return to a normal sequence of the so-called A, B, C bile fractions. The authors in concluding this report affirm that, in their opinion, "the striking gain in weight in most of the eighteen patients receiving insulin therapy was due, in part to the stimulating effect of insulin on external pancreatic secretion and bile and in part to a normal digestion and assimilation of aliment."

Thiocyanate Therapy in Hypertension.

Observations on the toxic effects of thiocyanate in cases of hypertension come in opportunely at this time. Blood pressure is much on the public mind. Laymen talk about blood pressure and discuss the *pros* and *cons* of the high and low blood pressure. Likewise, many therapeutic measures and agents have been employed by the profession in the therapy of these conditions.

*Archives Internal Medicine, February, 1932, page 330.

Hence, one may note with interest the observations of Goldring and Chasis* on the toxic effects of thiocyanate that has gained favor by its effect in reducing high blood pressure. It is observed by these authors that frequent confirmation of Pauli's observation, in 1903, of the potency of thiocyanate in reducing high blood pressure, has caused the general acceptance of the drug in this therapeutic field. The appearance, however, of toxic manifestations thirteen times in a series of seventy-four trials in fifty patients warranted a report of this important phenomenon in the use of the drug. They recall by reference to literature that Westphal and Blum administered 0.5 gm. three times a day for eight to twelve days in nine patients and noted a tendency to respiratory inflammations, muscle weakness and psychosis; Takacs observed a papular dermatitis following the administration of 1 Gm. daily for nine days; Weiss and Ruedemann and Ayman observed like toxic disturbances. Nichols, who presented a summary of this drug, recommended as a safe dose in man 1 Gm. daily, but Nerking noted toxic effects with doses of from 0.5 to 1 Gm. daily. Others were cited by these authors as having noted toxic effects more or less in the employment of this drug.

The authors used in their study from 0.13 to 0.65 Gm. three times daily for from one to four weeks. Of the fifty patients treated seventy-four different times with thiocyanate, thirteen presented toxic disturbances. Eleven of these toxic phenomena disappeared within a few hours to four days after the drug was discontinued. The usual appearance of toxic manifestations was: muscular fatigue, accompanied or followed by nausea, vomiting, disorientation and mental confusion; motor aphasia; hallucinations of sight and hearing. In fatal cases, there was progression of delirium, convulsive twitchings, coma and death. Two of the patients died as a result of thiocyanate poisoning. In 17 per cent of the patients receiving the drug, toxic manifestations appeared. A fall in blood pressure, the occurrence of toxic signs and death were apparently unrelated to the amount of thiocyanate administered or to the amount of residual drug in the body. The authors think that some persons show a distinct susceptibility to thiocyanate. At this time they affirm that to them there is not known any distinguishing marks by which these persons can be distinguished. Physicians employing this remedy may find in this report on the toxic manifestations interesting observations and a consideration of the articles cited in the bibliography will give one the German view of the drug as well as important publications in English by American authors.

*Archives Internal Medicine, February, 1932, page 321.

The Effect of Bronchial Asthma on the Circulation.

Frequently, the problem of heart action and circulatory conditions during an attack of asthma are presented to practitioners. Any consideration of this subject upon so large a group as fifty patients must arouse the interest of the medical practitioner. So one may comment on this report of Criep* who made a cardiovascular survey of fifty patients suffering from bronchial asthma.

As a result of prolonged attacks of dyspnoea, resulting in marked changes in the lungs, the general opinion has been that the heart may undergo permanent and fixed pathologic hypertrophy and dilatations but the conclusion of this author is that bronchial asthma does not have a permanent damaging effect on the cardiovascular system. Acute attacks, it is stated, may as a result of the associated asphyxia produce transitory disturbances in cardiac conditions.

Viscerocardiac Reflexes.

Scott and Ivy† have made an experimental study of this subject in frogs and dogs in the department of Physiology and Pharmacology at the Northwestern University Medical School. Its bearing on the alleged association of disease of the biliary tract with cardiac abnormalities in man is brought out and, hence, should have for practitioners an essential interest.

The authors review the point of cardiac irregularities induced reflexly from visceral excitation as supported by experimental evidence. The Goltz experiment of tapping the viscera in the frog and producing reflex slowing of the heart is noted. Carlson and Luckhardt's experiments showing that in the frog the stimulation of the lungs, gastro-intestinal tract and genito-urinary tract causes inhibition of cardiac rate, are noted. Schrager and Ivy reported that changes in blood pressure and heart rate through distention of the gall-bladder and biliary ducts were not uniform and they felt that the reaction of the cardiovascular system to distention of the biliary system is dependent on

*Archives Internal Medicine, February, 1932, page 241.
†Archives Internal Medicine, February, 1932, page 227.

the functional state of the cardiovascular system at the time the distention takes place.

Buchbinder, however, reported, according to the authors of this study, some interesting experiments in the frog wherein an incision of the gall-bladder causes transient arrest of the heart, lasting from one to ten seconds, and a bradycardia lasting from one to ten minutes. The authors investigated this phenomenon as related to spillage of bile into the peritoneal cavity. They found that the gall-bladder and biliary passages may be punched and stretched without causing a change in cardiac rhythm of frogs that show cardiac inhibition on mechanical stimulation of other abdominal viscera. They found that the incision of the gall-bladder of the frog so that bile is spilled into the upper abdominal cavity, without coming in contact with the heart, causes cardiac inhibitions. They further state that observations of Schrager and Ivy on the effect of distention of the biliary passages in the "normal" dog have been confirmed essentially.

The experimental evidence does not, they state, indicate positively the existence of a direct reflex connection between the biliary passages and cardiac activity. But the authors remind the reader that in the experiments performed on dogs and frogs up to the present time, presumably only normal mechanisms have been excited. Patients considered in such a condition have pathology in the biliary tract and heart as well, in all probability. Of course, say the contributors, man may possess a direct or more sensitive viscerocardiac mechanism but this is not likely since all patients with pathologic conditions of the biliary tract or other viscera do not manifest cardiac abnormalities.

President's Message

Organization.

Every law bearing on health and prevention of disease, every statute of a medical nature, State or Federal, has been enacted as a result of the efforts of the medical practitioners in cooperation with those especially interested in health and preventive measures.

In order to protect the public and at the same time preserve our dignity and position as a profession, it is very important for the physicians of the State to be organized and for the component society organizations to work together for the preservation of high ethical standards. No organization can function smoothly and efficiently unless the individual members work together harmoniously. It is with a sincere desire to bring about this condition in the Medical Society of Virginia that the officers of this society are appealing to every committee, to every member of each committee, and to every member of each component society, for cooperation.

We must recognize that there is a distinct need for health workers—both physicians and nurses—and it is regrettable that in some localities there is friction between the health workers and those in general practice. This is an unhealthy and unpleasant condition of affairs and should be corrected by conference and cooperation.

The response of the physicians of the State to the appeal for the general diphtheria immunization campaign throughout the State has been very gratifying.

I have received letters from doctors all over the State expressing their approval and pledging hearty support of the scheme. The general practitioners in any community could, by getting together and cooperating with the health workers, direct to their own satisfaction campaigns for enlightening and instructing the public and the profession in reference to numbers of diseases and conditions. If this is true, and undoubtedly it is—how great is our opportunity and how binding are the responsibilities resting on the general practitioner? The busy doctor in rural communities is often unable, because of lack of time, to stress the importance of preventive measures and may appear careless and indifferent in failing to advise his patients in these matters. In such communities health workers with tact and skill can easily demonstrate their usefulness and make a place and name for themselves without reflecting on the practitioner, but in the proper spirit aiding him and cooperating with him.

I wish here to call attention also to the work being attempted by our committee on Public Relations—State and County. Dr. Alex. F. Robertson is chairman, and I wish to recite here a portion of his letter:

"The Committee on Public Relations asks that you give us your cooperation in an attempt to advance our work largely through correspondence. We feel that visits to the various societies at the present time would entail an ill-advised expense and work a hardship on the committee members.

"The work of the Committee last year was largely a consideration of state medicine. So far as our own State is concerned we feel that we have nothing to fear from the activities of the State Health Department, under the conservative and sympathetic direction of our new Commissioner, Dr. Draper. However, in this connection we should like a statement from you as to local conditions, especially covering the question of infringement by health workers and nurses.

"In Federal encroachment we see our most insidious attack, particularly in governmental hospitalization of all ex-service men for disabilities not incident to service.

"Extension of this hospitalization to the families of veterans, to members of Congress, and to civilian employees are further steps along the road to state medicine which we should vigorously oppose. A discussion of this with our own representatives in Congress, stressing the enormous cost involved, would be helpful. If we could induce the American Legion to substitute greater benefits for disabilities of service origin in place of this hospitalization it would carry enormous weight.

"One function of our committee is to promote better feeling toward the profession by the public and we feel this can be forwarded by having at least one meeting a year of general interest, open to the public.

"If a guest is desired, a list of speakers may be obtained by writing to Mr. George Eutsler, Associate Director, Extension Department, University, Virginia.

"Will you bring these matters to the attention of your Society? Your committee will appreciate any suggestions you may wish to offer."

This is a fine letter and should stimulate active interest in the matters referred to.

I am convinced that real progress has been made in the work of coordinating the various agencies in the State Society since the meeting in Roanoke, last October. We have received cordial and encouraging letters, indicating a spirit of goodwill and cooperation, from sections where previously there existed some misunderstanding between physicians and health agencies.

I. C. Harrison, M. D., *President,*
Medical Society of Virginia.

Proceedings of Societies

Accomack Medical Society.

The annual election of officers was held during the December, 1931, meeting, at which time the following were elected for the ensuing year: Dr. James C. Doughty, Onancock, President; Dr. Ira Hurst, Parksley, Vice-President; Dr. John W. Robertson, Onancock, Secretary-Treasurer (re-elected).

Dr. J. H. Hiden, the retiring president, read a very interesting article which he has published in the *Medical Mentor*, entitled "Reflections upon the Difficulties of Writing" (April, 1931, issue). Dr. Hiden also gave a very interesting resumé of his year's work as president, stressing the fact that notwithstanding the general depression our society "had held together."

The February meeting was held under the auspices of the incoming president, Dr. Doughty. Dr. Rooker J. White, Keller, reported a very interesting case of Leukemia Complicated by Typhoid Fever. Dr. Gardiner, of the State Board of Health, gave a talk on Toxin-Antitoxin Immunization.

The question as to whether the local physicians or the Board of Health would handle the Toxin-Antitoxin clinics was postponed until a future date on account of the small number in attendance at the meeting.

Dr. Ira Hurst read an abstract of an article appearing in the current *Journal of the A. M. A.* regarding shortened Umbilical Cord.

The Society ordered the Secretary to send letters expressing regret over the enforced absence of Drs. Bradshaw and Critcher, incident to their illness and accident, respectively. Both have improved at this writing.

John W. Robertson,
Secretary.

The Post-Graduate Medical Society of Southern Virginia

Held its annual meeting at Lawrenceville, February 23rd, at 2 P. M. The invited guest, Dr. T. J. Williams, professor of Obstetrics at the University of Virginia, gave a most interesting lecture on the subject of "Backache in Gynecology." The discussion was led by Dr. J. Bolling Jones. The presentation and discussion by various physicians consumed the first two hours of the program and was greatly enjoyed.

The remainder of the program was as follows:

"Indications for Contraception"—W. M. Bowman, M. D., Petersburg.
"Common Chronic Infections of the Cervix and Vagina"—E. L. Kendig, M. D., Victoria.
"Beginners Program"—B. B. Bagby, M. D., Director Bureau Child Health, Richmond.
"Anemias in Infancy"—W. B. McIlwaine, M. D., Petersburg.
"Certain Aspects of Gastro-Intestinal Hemorrhages"—Hyman Cantor, M. D., Petersburg.

Sixty physicians attended the meeting, most of them being from the counties immediately adjacent to Lawrenceville, but there were several visitors from larger cities of the State, including Dr. I. C. Harrison, President of the Medical Society of Virginia, who made an excellent talk and also discussed several of the papers

Due to the unavoidable absence of Dr. Frank Mallory, President of the Society, the meeting was presided over by Dr. Wright Clarkson, Chairman of the Program Committee.

The following officers were elected: President, Dr. W. W. Seward, Surry; Vice-Presidents, Dr. H. G. Stoneham, Waverly, and Dr. E. L. Kendig, Victoria; Dr. Philip Jacobson, Petersburg, Secretary-Treasurer, and Dr. Wright Clarkson, Chairman of the Steering Committee, were re-elected.

The following committees were also re-elected: *Board of Censors:* Drs. T. F. Jarratt, C. S. Dodd, and W. D. Prince; and *Public Health and Legislation:* Drs. J. B. Jones, W. M. Phipps, and L. O. Vaughan.

Drs. T. H. Anderson and J. B. Vaiden, of Lawrenceville, acted on the Entertainment Committee and provided a delightful dinner following the meeting.

The James City-New Kent Counties Medical Society

Held its regular meeting at the Wayside Inn, Toano, Va., March 3rd, with the president, Dr. A. M. Sneed, of Toano, in the chair. Eight members were present.

There was some discussion about the administering of toxin-antitoxin to the pre-school child and it was decided by the Society to have a so-called clinic for this between March 15th and April 15th, 1932. This is to be given in the doctor's office and a charge of one dollar will be made for those able to pay.

The members present voted to send flowers to Dr. D. J. King, of Williamsburg, who has been confined to his bed for the past month.

It was decided to held the next meeting at Providence Forge, Va., on May 5th.

J. R. TUCKER,
Secretary.

The Tazewell County Medical Society

Held a meeting on March 18th, at which time the following were elected to membership: Dr. S. E. Massey, Amonate; Dr. James Williams, Richlands; Dr. Rufus Brittain, Jewell Ridge; Dr. William A. Seawell, Raven; and Dr. Herbert A. Porter, Boissevain.

Dr. J. W. Shawver, Richlands, is president, and Dr. Isaac Peirce, Tazewell, secretary.

Clinic by Norfolk County Medical Society.

The Norfolk County Medical Society held another of its all day clinics on March 30th, starting at 10:00 A. M. The morning clinics were at Protestant Hospital and the afternoon ones at St. Vincent's Hospital. All of these were conducted by members of the local society. Luncheon was served at Protestant Hospital following the morning clinics. Supper was at the Country Club, following which Dr. D. L. Borden, Professor of Surgery at the George Washington School of Medicine, Washington, D. C., gave a talk on "Some Unusual Intra-Abdominal Lesions," showing moving pictures.

The committee in charge of arranging the program, this year, was composed of Drs. Julian L. Rawls, A. B. Hodges, and R. DuVal Jones, Jr., all of Norfolk.

Richmond Academy of Medicine.

Dr. Charles W. Burr, of Philadelphia, prominent neurologist and professor of mental diseases at the University of Pennsylvania, was the guest speaker before the Academy at its regular meeting on March 8th. Dr. Burr's address on "Mental Diseases as a Social Problem" followed the annual dinner of the organization, which was held at Commonwealth Club. Dr. Burr is an acknowledged authority on his subject and is at present neurologist to several Philadelphia hospitals.

Another feature of the evening's program was an illustrated talk on "Medical Conditions in India," by Dr. Fred J. Wampler, director of the out-patient clinic of the Medical College of Virginia. Dr. Wampler recently returned after a year in India where he served as a member of a commission sponsored by the Institute of Social and Religious Research of New York to make a study of group missions in India.

Dr. Finley Gayle is president and Dr. Mark W. Peyser secretary of the Academy.

News Notes

Dates for our State Meeting.

As announced last month, the Medical Society of Virginia will hold its sixty-third annual meeting in Richmond. The Richmond Academy of Medicine, which will be the host to this meeting, has set the dates as November 1, 2, and 3, 1932.

It is hoped that doctors all over the State will reserve these dates and arrange to attend the meeting here next Fall.

New Orleans Meeting of the A. M. A.

Call has been issued for the eighty-third annual session of the American Medical Association to be held in New Orleans, La., May 9-13, 1932. While the House of Delegates will meet on the 9th, the Scientific Assembly will not open until the general meeting on the evening of May 10th. The various sections of the Scientific Assembly will start on Wednesday at 9 A. M. and subsequently, according to their programs. Dr. E. Starr Judd, Rochester, Minn., is president, and the president-elect, to be installed at the Tuesday evening session in the Municipal Auditorium, is Dr. E. H. Cary, of Dallas, Texas. The House of Delegates will hold all its meetings at the Roosevelt Hotel.

Those who have not made hotel reservations should do so at once. Dr. Emmett L. Irwin, Box 1460, New Orleans, is chairman of the Committee on Hotels.

Reduced railroad fares on the certificate plan may be secured on the basis of fare and one-half for the round trip. On this basis, the railroad and Pullman fares from several of the larger Virginia cities would be as follows:

	R.R. Fare on Basis Fare and Half for	*Pullman One Way*	
From	*Round Trip*	*Lower*	*Upper*
Richmond	$55.43	$11.25	$9.00
Norfolk	58.88	12.00	9 60
Petersburg	55 32	11.25	9.00
Alexandria	59.85	12.00	9.60
Charlottesville	54.24	10.88	8.70
Lynchburg	50.97	10.50	8 40
Roanoke	48.12	9.75	7.80

POST-CONVENTION CRUISE

Immediately following the convention, a delightful cruise has been arranged. The special ship for the physicians, their wives and friends will leave New Orleans on Saturday, May 14th, for a twelve-day trip to Havana, the Panama Canal and Puerto Cabezas, the banana port of Nicaragua. For further information as to rates, etc., address The Gardner-Coburn Tours, Bienville Hotel, New Orleans, or Standard Fruit & Steamship Company, 224 Baronne Street, New Orleans.

The Virginia Society of Oto-Laryngolgy and Ophthalmology

Is to hold its annual meeting at the Cavalier Hotel, Virginia Beach, Va, Saturday, May 21st, being entertained by the Norfolk doctors. The program has not been completed but a splendid meeting is expected. Dr. Clarence Porter Jones, Newport News, is president; Dr. Courtney Edmond, Clifton Forge, vice-president; and Dr. H. Grant Preston, Harrisonburg, secretary-treasurer.

Mother's Day Campaign.

Plans for a nation-wide Mother's Day Campaign to obtain better maternity care for expectant mothers are taking concrete form among many organizations, according to announcement by the Maternity Center Association, 1 East 57th Street, New York City.

Last year the Campaign sponsored by the Association culminated in a meeting of prominent citizens who voiced an indignant protest against the high maternity death rate in this country, and demanded America provide its mothers with more adequate maternity care, by means of which, authorities maintain, 10,000 of the 16,000 mothers who die annually in childbirth could be saved. The campaign last year interested fully as many men as women, and indicated that special efforts are to be made in 1932 to awaken prospective fathers to the fact that a well baby and a healthy mother require more than simply to let nature take its course.

Mrs. John Sloane, president of the Maternity Center Association, states that the Center will be glad to help local organizations everywhere to call the attention of their communities to the vital need for adequate maternity care. Mother's Day is Sunday, May 8th. Material for speeches, programs for women's clubs, outlines for church services and other helps for local campaigns are available free of charge to anyone interested in improving conditions in their locality.

"Find the Other Case."

This is the slogan which has been adopted in the Early Diagnosis Campaign, which is

being conducted by the National, State and Local Tuberculosis Associations in the month of April. By stimulating the existing case finding agencies to closer cooperation, these organizations hope to reduce still further the death rate from tuberculosis by discovering existing cases, at present unknown, and by inducing persons who have been in close contact with tuberculous cases to have an examination to assure themselves that they have not contracted the disease.

Physicians and others are urged to cooperate all possible with their local organizations in this campaign.

News Notes from University of Virginia, Department of Medicine.

Dr. D. C. Smith spoke before the Rockingham County Medical Society, meeting in Harrisonburg on February 8th, on Classification of Skin Diseases.

At the meeting of the University of Virginia Medical Society on February 22nd Dr. Hugh Trout, Surgeon in Chief, Jefferson Hospital, Roanoke, Va., spoke on the subject of The Release of Pericardial Adhesions.

On February 19th Dr. C. C. Speidel gave an account of his studies of living nerve fibers before the students in Biology at Lafayette College, Easton, Penna.

On February 17th, Dr. Thomas Spies of the Department of Internal Medicine of the Lakeside Hospital in Cleveland visited our Medical School.

Dr. H. B. Mulholland spoke before the Warwick County Medical Society, meeting in Newport News on February 22nd, on Recent Advances in the Study of Diseases of the Blood.

On February 26th Dr. Francis R. Dieuade, Professor of Medicine at the Peiping Medical School, China, visited our Medical School.

At the meeting of the University of Virginia Medical Society on March 7th, Dr. Kenneth Maxcy spoke on Recent Studies in the Typhus-like Fevers, and Dr. E. C. Drash spoke on Closed Internal Pneumolysis.

On March 14th, Dr. George R. Minot, Professor of Medicine at the Harvard Medical School, addressed the faculty and students on the subject of The Treatment of Anemias.

Medical College of Virginia News Notes.

Nutrition in Its Newer Aspects was the subject of Dr. James S. McLester, professor of medicine in the University of Alabama School of Medicine, when he gave the third Stuart McGuire lecture on Friday night, March 4th. Dr. McLester's paper will be printed in bulletin form by the Medical College of Virginia and will be made available for interested members of the profession.

Exhibits from various departments of the Medical College of Virginia were shown at the Tri-State Medical Society meeting held at Raleigh, N. C., last month.

In February the out-patient department of the college set a new record of 5,027 visits, or an average of 201 patients per day. The Richmond Kiwanis club has continued its appropriation of $1,800 for the orthopedic clinic of this department during 1932.

Construction work on the new library is proceeding according to schedule and it is expected this attractive new unit of the college will be ready for occupancy during the coming summer.

Dr. Robert C. Bryan, at his request, has been retired from the professorship of genito-urinary surgery and elected emeritus professor of genito-urinary surgery by the Board of Visitors of the college. For more than twenty-five years Dr. Bryan was actively on duty at the college.

Dr. Austin I. Dodson, recently assistant professor in genito-urinary surgery, has been appointed to succeed Dr. Bryan as professor of this branch. Following the World War, Dr. Dodson took post-graduate work in genito-urinary surgery, and has been connected with the staff of the Medical College of Virginia since 1920.

A symposium on fungus diseases will feature the monthly meeting of the faculty and staff of the Medical College of Virginia to be held March 17th. These meetings have set a new record for attendance this year, more than one hundred being present at a number of meetings. It is expected that a volume of the proceedings resulting from these meetings will be published in the fall. These will be available for inter-

ested members of the profession, both alumni and others.

Three Richmonders and nine other Virginians were on the dean's list of the school of pharmacy of the Medical College of Virginia. To receive such recognition the student must have made an average of 90 on the semester's work.

The program for the scientific monthly meeting of the faculty and staff of the college, which will be held Thursday, April 21, 1932, in the auditorium of St. Philip's hospital dormitory, will be (1) Osteomalacia, Dr. Fred J. Wampler; (2) The Neutralizing Effects of Saliva, Dr. J. C. Forbes. The profession is invited to this meeting.

General Walter Drew McCaw, distinguished alumnus of the college, will be awarded the honorary degree of Doctor of Science at Commencement May 31st. Dr. McCaw, son of the late Dr. James B. McCaw, is well known in Virginia for his outstanding work in the medical corps of the army from which he retired some time ago.

News Notes from the Duke University School of Medicine and Duke Hospital.

On February 18th, Dr. M. Pierce Rucker, of the Medical College of Virginia, gave a clinic at the Duke Hospital on Eclampsia.

On March 11th, Dr. Joseph Colt Bloodgood, Clinical Professor of Surgery, Johns Hopkins University School of Medicine, gave a clinic on Cancer of the Breast.

On the same date, Dr. George R. Minot, Professor of Medicine at Harvard Medical School, and Director of the Thorndike Memorial Laboratory at Boston City Hospital, lectured before the Durham-Orange County Medical Society, at the Duke Hospital, on The Treatment of Anemia, and also gave a clinic at the hospital the following morning.

Buxton Clinic to be Opened in May.

The Elizabeth Buxton Hospital, Newport News, Va., this year celebrates its twenty-fifth year of continuous operation as a general hospital, treatment being provided for surgical, medical and obstetrical cases. Dr. Joseph T. Buxton is surgeon-in-charge. The hospital has made wonderful strides. The first unit constructed provided accommodations for fifteen patients. With each succeeding five years additional units have been added so that it can now accommodate approximately one hundred patients. This hospital has always met the requirements of the American College of Surgeons.

In conformity with its five-year improvement program, the clinic building will be opened this year and will be known as the Buxton Clinic. This building, which is to be opened in May, is three stories in height and is located to the rear of the hospital building, fronting on Blair Avenue. The first two floors will contain offices for the medical staff, library, laboratories and general administrative offices. The third floor will be occupied by nurses. The opening of this building will increase the capacity of the hospital so that approximately one hundred and twenty-five patients may be accommodated.

Dr. Lula Woods Garst

Has returned to her work at Catawba Sanatorium, Va., after several months in Baltimore, where she was taking special work in gastro-enterology in the Department of Medicine at Johns Hopkins University.

Dr. N. W. Sisson,

Of the class of '24, University of Virginia, Department of Medicine, having finished a two-year service at Bellevue Hospital, New York City, has located in Washington, D. C., with offices at 1726 Eye Street, Northwest, for the practice of oto-laryngology.

Dr. William F. Drewry,

Director of the Bureau of Mental Hygiene, of the State Department of Public Welfare, early in March, gave a lecture on "Mental Hygiene and the Physician" at the Medical School of the University of Virginia.

$715,000,000 Spent in U. S. Yearly for Medicines.

"The Costs of Medicines," published by the University of Chicago Press, discloses authentic figures on the drug industry in this country obtained through a three-year study on the subject made for the Committee on the Costs of Medical Care by Dr. R. P. Fischelis, vice-president of the American Pharmaceutical Association, and Dr. C. Rufus Rorem, formerly a staff member of the Committee.

It is stated that the people of the United States spend $715,000,000 annually for drugs and medi-

cines, which constitutes about 20 per cent of the national bill for sickness. Of this amount $190,000,000 (26.6 per cent) is spent for medicines prescribed by physicians; $165,000,000 (23.1 per cent) for non-secret home remedies and $360,000,000 (50.3 per cent) for "patent medicines" of secret composition.

It was discovered that the average expenditure for medicines is approximately $22 annually per family of four persons, or $5.50 per member. Actual expenditures per capita vary widely, however, and tend to be highest in the cities.

Some other important facts disclosed by this survey are:

Patients attempting to diagnose their own ailments by comparing their symptoms with those described in patent medicine advertisements may frequently forego proper medical attention until it is too late to effect a cure.

"Official" medicines can usually be purchased by the pharmacist for a fraction of the price of proprietary medicines or ethical specialties, with a corresponding reduction in price to the patient.

Provided they were engaged in no other pursuits, approximately 10,000 pharmacists could fill the 165,000,000 physicians' prescriptions now annually filled by 115,000 registered pharmacists in 60,000 drug stores. Limiting the compounding of prescriptions to 10,000 pharmacists in as many drug stores, however, would leave many communities without pharmacists and in larger communities would spread the number of pharmacies, making it inconvenient for the public to obtain prompt prescription service. On this account, the merchandising activities of drug stores, frequently derided, make the services of registered pharmacists available and more convenient to the public.

May Day—National Child Health Day.

The American Child Health Association appeals to people everywhere to "support your community Child Health Program: it protects your home." It states that the general purpose of May Day 1932 is to focus the spirit of this year upon the needs of children, in order that

Each child may be sheltered in its own home and share secure family life;

Each child may have essential food elements in each day's diet;

Each child may have an adequate amount of clean and safe milk;

Each child may have plenty of sunshine, sleep, rest and recreation;

Each infant may be born healthy, of a healthy mother who will live to love her child and take care of her family; and that all

The nineteen points of the Children's Charter—the Magna Carta of Childhood—may be put into practice in every community.

Dr. B. B. Bagby, Director of the Bureau of Child Health, State Department of Health, Richmond, is Virginia's chairman for May Day.

Dr. Benj. E. Hunt,

Of the class of '24, Medical College of Virginia, recently completed a year's residency in obstetrics at the Jersey City Hospital, Jersey City, N. J., and has located temporarily at his home at Jeffs, Va.

Warning.

One of our members has suggested that we issue a warning against one Mr. James Murray who represents himself as being from Cleveland, Ohio, and selling stock in an advertising scheme. He pretends to have met you before and is just renewing an acquaintance. One will hardly be interested in his stock. Then he will come back with some hard luck story and ask to have a check endorsed for him.

This member states that he has one of this man's checks which was returned, marked "no such account."

Mr. William L. Sohl,

Of the Laine Chemical Company, announces his removal to Bridgeport, Conn., where he will take charge of the office of this company.

Industrial Eye Accidents.

Although most industrial eye accidents are preventable, American industry every year permits the loss of one or both eyes by more than 2,000 workmen, 300,000 minor eye injuries, and the annual waste of approximately $50,000,000 in time lost, compensation payments, and medical bills. These facts were brought out by speakers before the session on "The Eye—Its Relation to Safety," sponsored by the National Society for the Prevention of Blindness, at the Third Annual Greater New York Safety Conference, February 24th. Many interesting reports were given.

A mandatory rule requiring every employee in an industrial shop to wear goggles while at work, on penalty of dismissal, was advocated by

Harry Guilbert, Director of Safety for the Pullman Company, Chicago, Ill., member of the Executive Committee of the National Safety Council. As a result, the Pullman shops at Chicago and other places enjoy the remarkable distinction of not having a single eye loss in the last six years among the thousands of men daily engaged in dangerous work.

The American Proctologic Society

Is to hold its annual meeting in Memphis, Tenn., May 6th and 7th, so that those planning to attend the meeting of the American Medical Association may reach New Orleans in time for that meeting. A program of much interest has been arranged. Dr. W. O. Hermance, of Philadelphia, is president, and Dr. Curtice Rosser, Medical Arts Building, Dallas, Texas, secretary.

The Thomas W. Salmon Memorial Lectures.

These lectures are to be delivered by Dr. Adolf Meyer, Professor of Psychiatry, Johns Hopkins University and Director of the Henry Phipps Psychiatric Clinic, Baltimore, at the New York Academy of Medicine, Friday evenings, April 8, 15, and 22, 1932, at 8:30 P. M.

Dr. Meyer was chosen by the committee in charge of the lectures in recognition of his services to American psychiatry and his eminence as a scientist and teacher in this branch of medicine. His subject for these lectures will be "Psychobiology."

The Thomas W. Salmon Memorial Lectures were established in honor of the late Dr. Thomas W. Salmon, Professor of Psychiatry of Columbia University and the first Medical Director of The National Committee for Mental Hygiene. He was a leader in mental medicine and did more in his day to advance the care and treatment of the mentally ill in this country than perhaps any other one professional man.

Shortly after his death his friends and associates formed The Thomas W. Salmon Memorial Committee, which raised an endowment fund of $100,000 as a permanent memorial in his honor for the advancement of psychiatry and mental hygiene, and each year an outstanding worker in these or related fields will be selected to give the Salmon lectures, which form the main activity of the memorial.

Oversupply of Graduate Nurses.

According to the Committee on the Grading of Nursing Schools, training schools must curtail the steady production of more nurses or the morale of the nursing profession will break down completely. How serious the oversupply of graduate nurses has become is revealed by the Committee after tabulating figures for eighteen states and the District of Columbia. For this group, since the 1920 census, the total population has increased 7 per cent, while the total number of trained nurses has increased 78 per cent.

Although there are still areas of the country and groups of patients not properly nursed, owing to poor distribution and lack of special training, the figures for the forty-two cities studied show that the average nurse has no more than 149 days of employment in any given year, according to the present sickness rate. However, according to the *American Journal of Nursing*, there still exists the unnursed patient in certain fields and some of the unemployed nurses can well take up special training that will fit them for these types of service.

The Richmond Academy of Medcine

Announces the following interesting programs:

April 12—Radiologic Examination in Intestinal Perforation—Dr. Daniel D. Talley.
A Discussion of Function and Repair of Pelvic Fascia—Dr. Stuart Michaux.
Acute Epidemic Tracheitis—A Preliminary Report—Dr. W. Ambrose McGee.

April 26—The Care of the Weak Foot—Dr. J. B. Dalton.
The Filterable Viruses and Bacteriophage—Dr. Earl B. McKinley, Dean of George Washington Medical School, Washington, D. C. Dr. McKinley was formerly Associate Professor of Bacteriology at Columbia and Director of the Porto Rico School of Tropical Medicine.

The programs for May have not been completed, but will include:

May 10—Symposium on Pulmonary Tuberculosis—Drs. Dean Cole, Frank S. Johns, Kinloch Nelson, L. O Snead and P. E. Schools.

May 24—Dr. William Gerry Morgan, Washington, D. C., will be the guest speaker.

Dr. A. M. Showalter,

Christiansburg, Va., was the principal speaker at exercises held in observance of the George Washington Bicentenary, under the auspices of Hellenic Lodge No. 249, at the Masonic Temple, Richmond, Va., on March 25th.

Child Guidance Work Grows.

An increasing tendency to seek medical advice and treatment for mental disorders, behavior and personality problems, and other forms of human maladjustment, when the earliest symptoms appear, is reported by The National Committee for Mental Hygiene, which has recently finished a nation-wide in-

ventory of existing facilities for the study and management of these conditions outside of institutions. This tendency is reflected in a marked growth in the number of mental hygiene and child guidance clinics established in various communities in the United States during the past ten years. In 1920 such clinics were comparatively rare. Today there are some 674 clinics which provide a regular mental health service to the public in thirty-four states, most of these having come into existence since 1922, when The National Committee for Mental Hygiene and The Commonwealth Fund first joined forces in the development of organized child guidance work. More than 50,000 children with all sorts of behavior disorders and mental problems were examined and treated in these clinics during the past year.

Health Work in Java.

The Government public-health service of Java sends out workers all over Java and neighboring islands with educational films showing how diseases are contracted, prevented, and cured. The development of nursing in Java has been very rapid during the last fifteen years. In 1930 there were no less than 800 locally trained nurses and 861 probationers. The girls begin their studies as early as sixteen years of age and are given a thorough course.

The Clinical Society of the New York Polyclinic Medical School and Hospital

Had the following program of papers scheduled for its meeting on the evening of April 4th:

1. Insulin in the Treatment of Tuberculosis (Preliminary Report). Case Reports—Frederick M. Allen, M. D.
   Discussion.
2. Remarks on the Adrenals in Their Relation to the Nervous System—S. Philip Goodhart, M. D.
3. The Constitutional Background of Graves' Disease, Allied Syndromes—John Carroll, M. D.
4. Principles Involved in and Clinical Aspects of Denervation of the Adrenal Glands—George W. Crile, M. D, Cleveland (by invitation).
   Discussion opened by Foster Kennedy, M. D.
   General Discussion.

The reading of the papers and discussions were followed by an executive session and supper.

President-Elect of the A. M. A. to Speak in Roanoke.

Dr. Edward H Cary, President-elect of the American Medical Association and prominent specialist in diseases of the eye, ear, nose and throat, of Dallas, Texas, will be the special guest on April 7th of the Gill Memorial Hospital of Roanoke, Va. Following a dinner at the Roanoke Country Club, Dr. Cary will give an address on "The Modern Doctor and His Relation to the Public," to the members of the Post-Graduate Class of the Gill Memorial Hospital and to doctors of that community.

Malnutrition of Children.

The National Organization for Public Health Nursing reports an increase in malnutrition from 18 to 60 per cent since 1928 for the children coming to a certain health center in New York City. One thousand fewer children than in 1929 were able to meet the "blue ribbon" standard of health of the Louisville, Ky., public schools. A nursing unit reported that many expectant mothers were unable to obtain even one glass of milk a day. Calls upon this unit for free milk had increased 41 per cent since 1929, many requests coming from families which had not formerly needed help. The demand for services of public-health nurses is increasing enormously, according to the national organization. At the same time many of the nursing units report reduction in budgets and staffs and in fees from patients.

The South Piedmont Medical Society

Will hold its regular semi-annual meeting in Danville, Va., the third week in April, under the presidency of Dr. C. W. Pritchett, of that city. As usual, this meeting promises to be quite interesting. Detailed information may be obtained from the president or from the secretary, Dr. George A. Stover, South Boston, Va.

Dr. Hugh S. Cumming,

Former Virginian and a member of the Medical Society of Virginia, early in March took the oath of office as Surgeon-General of the U. S. Public Health Service for the fourth time. Dr. Cumming entered the Service thirty-eight years ago and has been Surgeon-General since 1920.

Dr. W. H. Batte,

Formerly of Penns Grove, N. J., is now connected with the medical staff of the Norfolk and Western Railway, and is located at Williamson, W. Va. Dr. Batte is an alumnus of the Medical College of Virginia.

XUM

European Clinic Tour.

Have you written for detailed information regarding the European Clinic Tour for next summer?

Do you realize what an immense value you can get for your money at these depression prices?

Shall we not send you a copy of the Tour Booklet?

Dr. A. S. Lilly

Has returned to Richmond, Va., after studying for two years in the University of Pennsylvania Graduate School of Medicine. He has offices in Medical Arts Building and is limiting his work to internal medicine.

Dr. George H. Snead,

Richmond, Va., who has spent several weeks studying at the University of Vienna and at Budapest, will tour in Italy, Switzerland, France and Belgium, during April. He will return to Richmond about the middle of May.

Porto Rico's Bureau of Women and Children.

The Porto Rican Legislature at the 1931 session created a department of labor for the island which includes a bureau of women and children in industry. The bureau is authorized to investigate and report concerning the welfare of working women and children and to plan for improvement in their conditions.

For Sale—

Professional McCaskey Record System. Practically new. Will sell at sacrifice. Address No. 340, care the MONTHLY. (*Adv.*)

For Sale—

Physician's microscope complete. First class condition. Price reasonable. Address "Micro," care this journal. (*Adv.*)

For Sale—

Office furniture and instruments for use in general practice, account death. Address Mrs. L. F. James, 2318 Grove Avenue, Richmond, Va. (*Adv.*)

Wanted—

One used vertical fluoroscopic table. Must be in good condition. Address "V. F. T.," care this journal. (*Adv.*)

Hourly Nursing Service.

The Private Duty Nurses' Club of Richmond, Va., announces the inauguration of an Hourly Nursing Service, in which its members are subject to call for service in all branches of the work that can be adequately performed in the home, at the following rates: $1.50 for the first hour or less, and 50 cents for each additional hour or fraction thereof.

The Club realizes that due to the present economic situation there is a pressing need for a service of this kind in Richmond, which has heretofore been furnished only by the I. V. N. A. The adoption of a similar movement will render a distinct service to the people who do not care for or cannot afford a full time nurse. It will also help to solve the unemployment situation among members of the Private Duty Nurses' Club.

For information, dial 3-1656. (*Adv.*)

For Sale—

Alpine Sun Lamp, 60 cycles, 110 volts, made by Hanovia Chemical and Manufacturing Company. Lamp bought in 1930. Guaranteed perfect condition. Used less than twenty-five hours. Cost $440.00; will sell for $250.00. Address "Lamp" care this journal. (*Adv.*)

For Sale—

A rare opportunity for a progressive doctor, close to Richmond. Extremely successful field, good office practice. Eight-room modern home with modern offices attached; present doctor and owner moving to the city. This opportunity is worthy of inspection.

All correspondence treated strictly confidential. Address "Location" care this journal. (*Adv.*)

Obituary Record

Dr. Edward S. Hart

Died at the home of his daughter in Bedford, Va., February 29th. He was eighty-three years of age and a graduate from the Western Reserve University, School of Medicine, Cleveland, Ohio, in 1873. After a private practice in Minnesota for some years he entered the government service as a physician in the Indian department and continued in this work until his retirement in 1915, at which time he became a resident of the Elks' National Home in Bedford. He had spent the last year and a half in the home of his daughter.